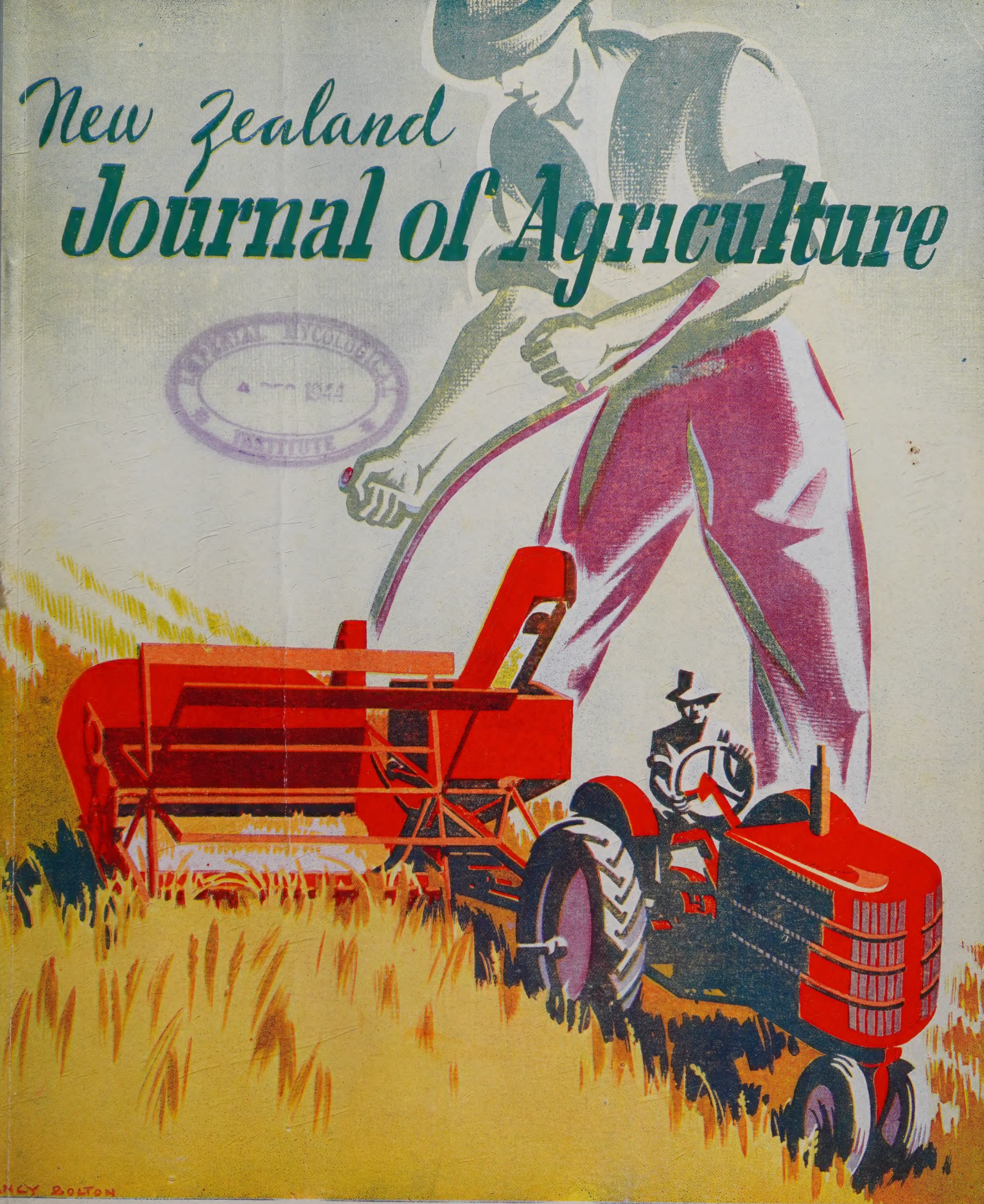


New Zealand Journal of Agriculture



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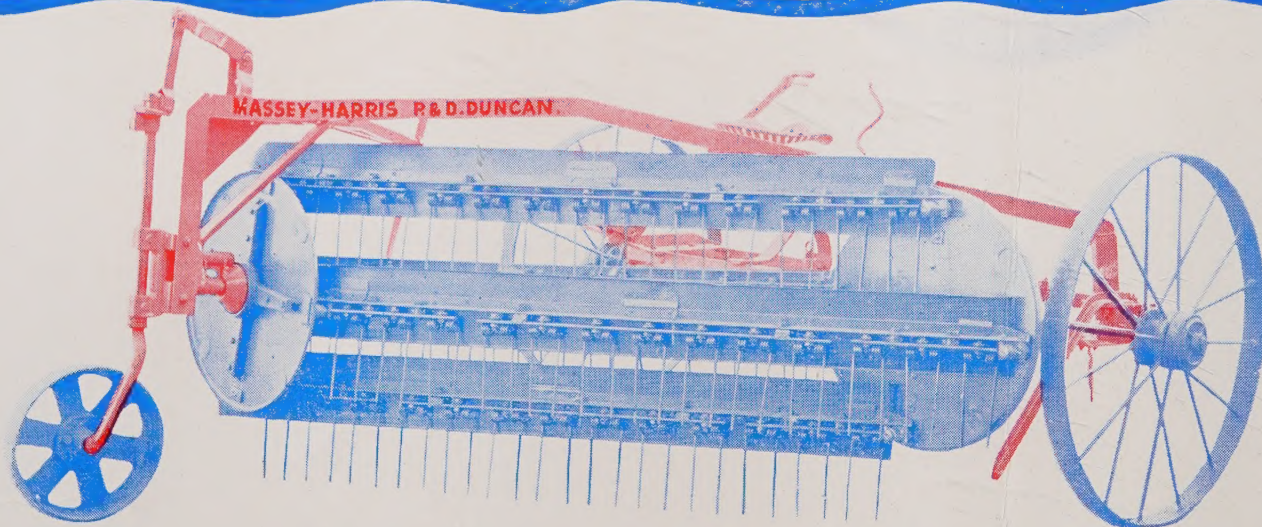
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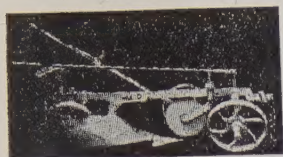
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THE NEW ZEALAND



JOURNAL OF AGRICULTURE

Vol. 69. No. 4.

October 16, 1944.

Wellington.

Published by
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Hon. B. Roberts,
Minister of
Agriculture.

How British Farming Met the Crisis

A farmer, surveyor, and land agent, Mr. Herbert Butcher, M.P., who visited New Zealand recently with the United Kingdom Parliamentary Delegation, is particularly qualified to comment on wartime farming as he knows it in Great Britain and as he saw it in the Dominion. This article is drawn from an address broadcast by Mr. Butcher over the New Zealand national network.

FARMING is just about the oldest occupation which man has followed, and there have been enormous changes from the time when, with the sharp point of a stick, he just poked about in the earth, to the present day, when we use multi-furrow ploughs drawn by caterpillar tractors. All through this long experience certain lessons have been learned, and it is about one or two of these lessons, in the light of British wartime farming, that I want to write.

One lesson was that land must not be neglected, and that, I am sorry to say, is what we did in England between the war of 1914-18 and the present outbreak. We were crazy enough to allow over a million acres to go out of production; to let hundreds of thousands of our rural population drift away to the cities. We neglected our hedges and our ditches. British agriculture was in a pretty poor condition, because a farm is different from a factory. You just can't put a farm on a care and maintenance basis and then expect it suddenly to come into production by the pressing of an electric button.

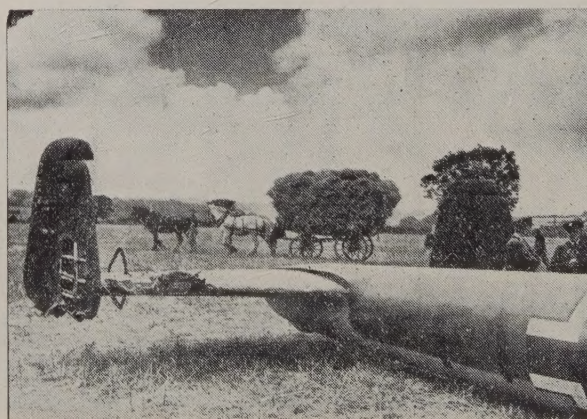
So our job was to step up production rapidly. To do this the general policy for agriculture was determined by the Minister, and he had the assistance of County War Agricultural Executive Committees, which are similar to New Zealand's Primary Production Councils. Our Agricultural Committees are composed of practical farmers—usually the best, but not necessarily the biggest, farmers in each district, although of course workers' representatives and agricultural experts are represented on these committees.

Farmers Classified

During the course of the war every farm in England has been examined on the spot by members of these committees. They decided what kind of a farm it was, and they put the farmers in three categories: The (a) category,

which is the skilled farmer with good equipment who needs little supervision; and then the farmer in class (b), who could do better if he really tried. He is dealt with pretty severely. He is usually given a year in which to put himself into grade (a) or to get out. And then there is the class (c) farmer. He may be lacking in experience, although he is a good hard worker; or his farm may be short of labour; or he just hasn't got the right implements to do the needed cultivation. But if he is willing and eager to play his part in the national effort, he is helped: money is found if that is his trouble: labour is provided or cultivation is done for him. Everything is done to help him along. But if he is not willing, or is incapable of being helped, then his land is taken away from him for the duration of the war and for three years thereafter, and is farmed by a competent farmer in the district or by the War Agricultural Committee itself.

Our task at Home has been to produce the maximum amount of food which will save shipping. We have got down from eight million tons of imported foodstuffs for cattle to one million. We are growing more wheat, more oats than ever before, and the potatoes which form so large a proportion of British wartime diet are Home-grown. We have pushed the production of these up by 80 per cent.



A wrecked Nazi bomber which has crashed in this English harvest field is not allowed to interfere with the work.



Thousands of acres of former wasteland are being brought into production.



Clearing bushes and undergrowth to bring more wasteland into production.



Night ploughing has been made practicable with a specially-designed headlamp, and work goes on after darkness.



A Land Girl preparing the fine and firm seed-bed necessary for sugar beet. Fifty thousand farmers produce a large part of Britain's sugar ration.



The sugar beet bulbs have gone to the factory for processing and the tops are fed out to dairy cows.



Electric milking machines on a progressive farm. Priority is given for liquid milk to expectant mothers and young children.

All this has been done without reducing in any way the strength of our dairy herd, because we are determined to give priority for liquid milk to expectant mothers and young children. We remember that during the last war the number of milking cows fell by one-third, and so we are pleased that in the present war, so far from there being a fall, there has been an increase—not very big, but an increase just the same—of 5 per cent.

Farm Labour Husbanded

Labour on the farms has not been allowed to leave the industry or even to join the Armed Forces, except with the consent of the War Agricultural Committee. Each farm is examined to see whether labour can be spared, and if a man can be removed he is taken away from the farm and enlisted in the Fighting Forces or directed to another farm where his help is most desperately needed.

Most admirable work is being done by members of the Women's Land Army. These girls are drawn, in the main, from cities, and from all walks of life. They are equipped with boots and leggings and coats and hats and sent to work wherever their labour can help production most.

There have, of course, been difficulties. The work has been hard; the weather has been inclement; the farmer has been too old-fashioned to realise that a girl can give him real help, or the farmer's wife has been so stupid as to say that she didn't want another woman on the farm, but all these difficulties have been overcome and a real contribution has been made by these girls. It has been our experience that the most valuable place where they can give help and assistance is in taking care of livestock, particularly on the dairy farm.

Fixed Prices the Key

The Government has learned that if it is to secure the maximum production from the land, it must give the farmer a guaranteed price, and a price which will enable him not only to live, but to pay wages which will compete with those paid in the cities. So every farmer in Britain is assured that every bit of produce from his land,

no matter what it may be—milk, potatoes, wheat, or vegetables—will be bought by the Government at fair prices fixed by agreement, because not only has the farmer to get a sufficient return for his produce to live and pay his wages, but he must also get a sufficient return to enable him to fulfil the age-long ambition of the farmer, and that is to leave his land in better heart than it was when he took it over.

It has been a great delight to me as a member of the Empire Parliamentary Delegation from Great Britain to see the high standard of farming in New Zealand. I'm not a grassland farmer myself, but I'm quite sure that nobody understands the management of pastures—or paddocks, as you call them—better than the New Zealander. Seed from your paddocks has been of the greatest possible value to us in wartime, and we are very grateful to you.

It has been a delight, too, to go into some of the lovely homes on these farms and to meet the farmer and his wife, and to hear how eager they are to increase production to help feed Britain, and to play their part in this great war effort.

An Empire Effort

The farmer in Britain is working with you. He is producing the bulk stuff now to save the shipping, and he is looking largely to Canada to produce the things like bacon of high food value. He is looking to the New Zealand farmer for butter, for cheese, and for meat. We are all working in this job together—the farmers of Britain, the farmers of Canada, the farmers of New Zealand.

After the war there are going to be all sorts of problems to solve, and they won't be solved by wishful thinking, but by applying in those days some of the lessons we have learned in wartime. And this is the main lesson that I would say the world has learned: Unless the countryside is fertile and well cared for, and the farmer is prosperous, there's no true prosperity for the city.

Photographs used in this article have been provided by courtesy of the British Ministry of Information.

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The Dysart stud are **WONDER** clients of long standing.

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THE SHORTAGE OF SUPERPHOSPHATE MAKES THE EFFECT OF “**WONDER**” MINERAL STOCK FOOD STILL MORE VALUABLE TO THE PRODUCER.

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PIG MANAGEMENT

One Litter Produces £42/19/-

Little publicity is given to the efforts of farmlet owners in answering the call for increased production, but from the following account it is clear that the collective activity of many such farmers can make a valuable contribution towards the success of the production drive.

ON Clarkin's Road, in the outskirts of Hamilton, is the property of Mr. Tom Waite, comprising 4 acres, of which $3\frac{1}{2}$ acres are devoted to grazing five milking cows, a yearling heifer, and an outstanding sow. Mr. Waite is employed in town in the stock meal department of a long-established firm, but his interest in farming extends

By

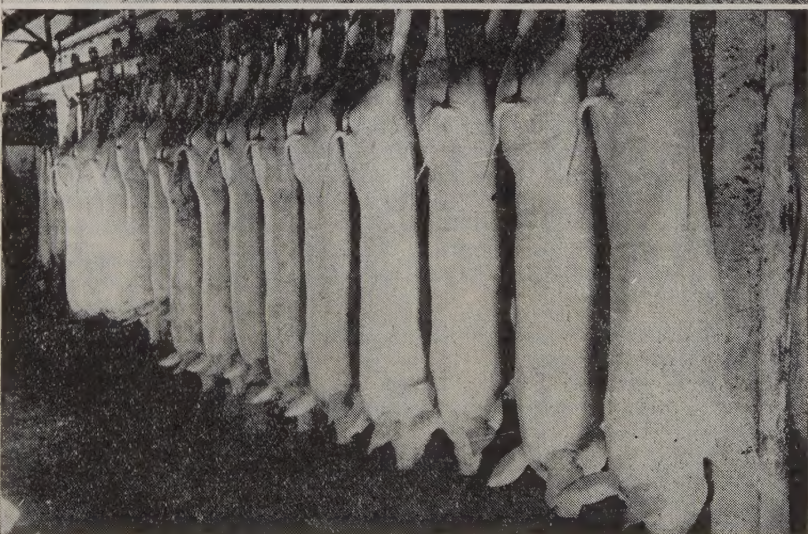
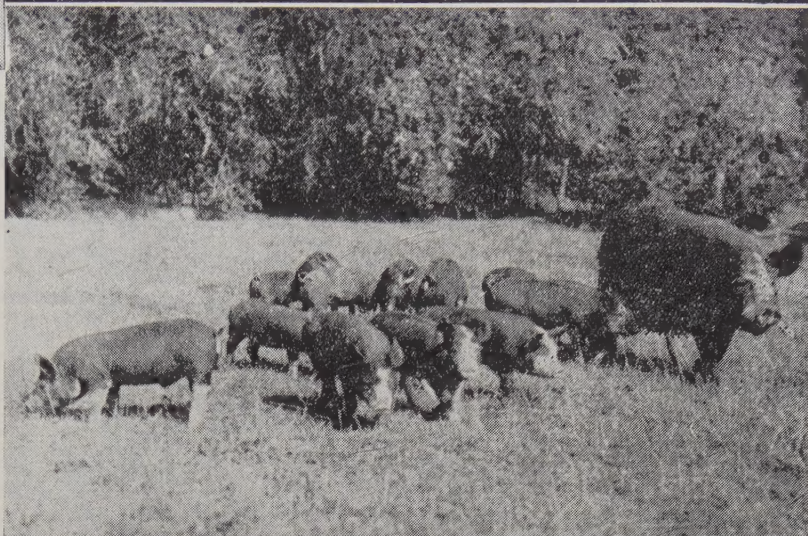
A. T. SHANNON,
Field Economist, Hamilton.

from the time spent on farms as a youth and a period as a breeder of pedigree pigs. After being out of the country for a short time he desired to go in for pigs once again, and in September, 1942, he purchased three weaners in the local stock sales, one of these being a sow. Fed on meal and the skim milk from four cows, these pigs did well, but the sow displayed such good qualities of type and constitution that she was retained for breeding when the two other pigs were sold in February, 1943.

This sow, a rather long-snouted Canadian Berkshire, was then mated, at 8 months old, to a pure-bred Berkshire boar belonging to a neighbour, Mr. J. W. Chapman, and bred by the N.Z. Dairy Company, Te Awamutu. With the limited milk supply steadily diminishing, the sow was fed on a proprietary mixture of cereal meals steeped in water for 12 hours and fed with added hot water and any milk available. There was full access to grazing on half an acre, but no roots, or other feed, was provided.

The sow farrowed her first litter on July 9, 1943, rearing all 10, comprising 6 sows and 4 boars. The latter were castrated and sold after seven months

1330 lb. PIG MEAT FROM ONE SOW IN FIVE MONTHS



FARM LABOUR WANTED

MANAGEMENT, or Assistant, sheep, cattle and agriculture, pref., fully-qualified, Married Man; good residence. *W.O.L. 1000 Agent*

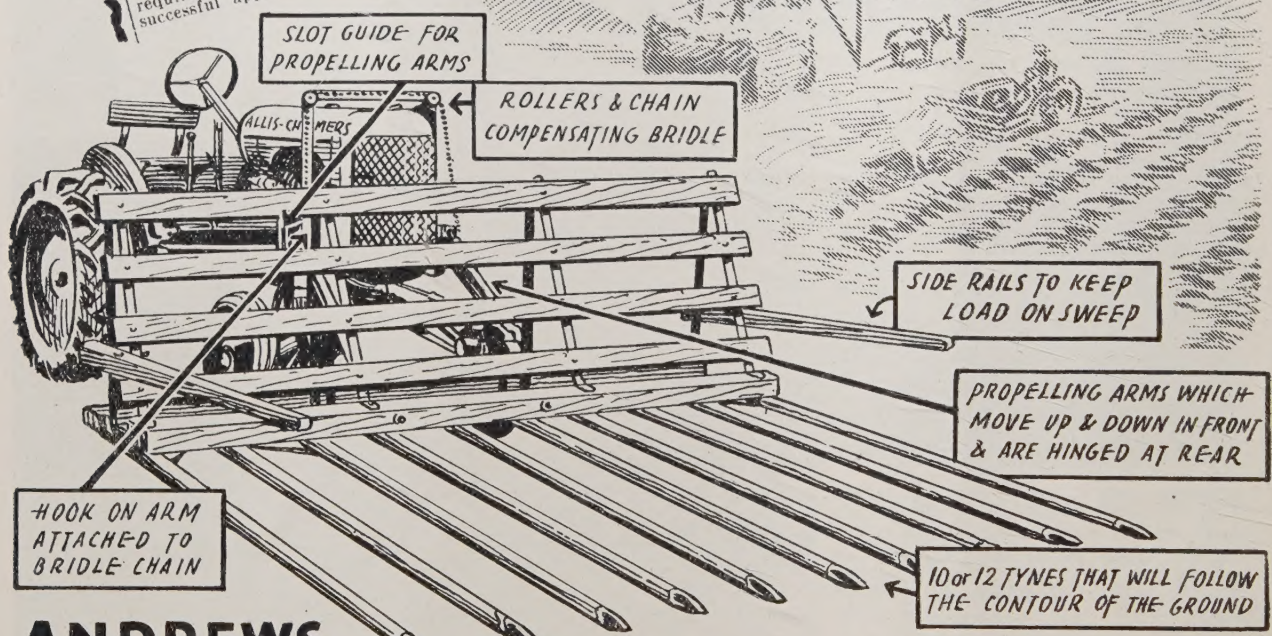
YOUTH, 18, exper., essential; handy Flat district; wages and

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in February, 1944, averaging 145lb., while the sows found willing buyers for breeding purposes. It is interesting to note that three of these sows have just farrowed their maiden litters, one having 9, one 10, and one 11. Mr. Waite mated his sow again to the same boar as previously in September, 1943, and fed her once more on cereal meals to the amount of just over a pound per day, together with a little milk and full access to pasture. In consequence, she was in excellent condition when on January 10, 1944, she farrowed a litter of 14 under natural conditions, without any attention whatsoever.

Farmers are entitled to the assistance and advice of the District Pig Council Supervisors. Pig producers have provided the funds to enable these Councils to be set up, and all farmers are urged to take every advantage of these facilities. Applications for assistance should be made to the Department of Agriculture or to District Supervisors as follows:—Whangarei (Box 131); Pukekohe (Box 32); Whakatane (Box 12); Gisborne (Box 316); New Plymouth (Box 131); Palmerston North (Box 80); Dunedin (Box 693); Christchurch (Box 639); Hamilton, Wesley Chambers.

The dwindling milk supply had to be husbanded carefully, and creep feeding was begun when the piglets were three weeks old, linseed meal being used principally, so that the litter was weaned when just six weeks old and put on to the steeped cereal meals and hot water. At this stage the litter was getting about 7lb. of meal twice a day and unlimited grazing. Mr. Waite weighed these pigs on March 19, 68 days after birth, and the average live weight was 56.9lb., the lightest being 39lb. and the heaviest 69lb. The meal feeding was continued until the pigs were five months old, when they were slaughtered, killing out at an average of 95lb. carcase weight. Over the period of five months the value of meal consumed by the litter amounted to approximately £11, so that the total sales return from 1330lb. of pig meat less this cost of meal was in excess of £30, surely a profitable venture.

In March, 1944, the sow was again mated, this time to the pedigree Berkshire boar of Mr. C. T. Bones, of Kaipaki, and bred by the Mountley Stud. This time she farrowed 13 pigs, one of which died in the first few days, and the other 12 thrived. At three weeks the litter had just begun to take the food in the creep when the sow showed a marked disinclination to continue feeding the piglets, in spite of a full supply of milk in the

udder and all the encouragement on the part of Mr. Waite. The sow showed herself to be in season, and under the circumstances there was no other option than to wean the litter on August 10. To date this has been very successful, and the pigs are progressing well on linseed meal. Mr. Waite, who is naturally watching their progress with considerable interest, proposes to weigh them in due course to provide a comparison with the previous litter weights. The sow has since been served by Mr. Chapman's boar, and Mr. Waite is keenly awaiting the results of the next farrowing.

"You will see that inside 12 months 37 pigs have been born, 36 of them surviving. To get results like this it is absolutely necessary to feed right, and that applies to both the sow and her litter. Also, you have to feed the sow consistently right through the piece. There is never a time when my few cows can provide enough skim milk for the pigs, but as a result of spending a few pounds on meal I have been able to carry as many pigs with profit as you will find on a sizable farm. There is no elaborate set-up for the pigs; they have a house to sleep in, besides ample hedges for shelter, and are never stied. I give them the run of a half-acre paddock, ringing the young pigs at weaning. I believe in providing adequate trough room for feeding and prefer a single trough."

Pig Industry Broadcasts

UNDER the auspices of District Pig Councils, broadcasts will be delivered in November as follows:—

Auckland—1YA, on November 15, at 7.15 p.m., "Housing for Pigs," by H. E. Clark, Supervisor, Auckland District Pig Council.

Wellington—2YA, on November 19, at 7.30 p.m., "Carcase Quality," by C. H. M. Sorensen, Supervisor, Taranaki District Pig Council.

Christchurch—3YA, on November 16, at 7.15 p.m., "Common Diseases," by Hector McIntosh, Canterbury District Pig Council.

Napier—2YH, on November 9, at 7.30 p.m., "Talk to Orchardists," by I. W. Owtram, Tairāwhiti District Pig Council.

Paddock Hot Water



12 Cupfuls Boiled in Six Minutes with the "Thermette" Chip Heater. No special fuel required, only twigs, paper or rubbish. The more wind the quicker it boils. A boon for milkers, stockmen, shepherds, fencers, motorists etc.

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20 to 30 Gallons per Day!

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SUPERWELL
Another Famous Pump
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Brown Bros.' "Superwell" is the ideal pump for farm or homestead. This modern pump is rubber mounted, vibrationless, fitted with Timken roller bearings on crankshaft and ball-bearing connecting rod. The "Superwell" is built with the precision of a high-class car engine. Pumps over 300 gallons per hour at 50lb. pressure up to a head of 115 feet.

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Pedigree Sow Records

OF the 7 litters recorded during the period January 1, 1944, to June 30, 1944, there were 5 sufficiently good to be included in one of the five grades set out below:—

Grade.	Litter Weight.	
	At 3 Weeks.	At 8 Weeks.
1	120 lb.	360 lb.
2	100 "	300 "
3	90 "	270 "
4	80 "	240 "
5	70 "	210 "

Contributed by the Livestock Division.

THE following table sets out the performance of each breed as an average for all litters recorded during the period under review:—

Breed Averages for Period

Breed.	No. of Litters Recorded	No. of Pigs per Litter.		Litter Weight at		Weight per Piglet.	
		Born.	Weaned.	3 weeks. (lb.)	8 weeks. (lb.)	3 weeks. (lb.)	8 weeks. (lb.)
Tamworth	3	81.3	254.3	7.7	6.7	12.09	37.95
Berkshire	3	85.7	259.0	11.0	7.3	11.74	35.88

THE following lists give the names and addresses of the owners, the herd book numbers of the boars and sows, together with the adjusted litter weights at three and eight weeks, the grade of the litter, and the number of pigs born and weaned.

In connection with the grading of litters a No. 3 grade is looked on as a good performance, No. 2 as excellent, and No. 1 as special.

Tamworths

Owner's Name and Address.	Herd Book No. of—		Litter Weight (lb.)		No. of Pigs		Grade of Litter
	Sire.	Dam.	3 weeks. (lb.)	8 weeks. (lb.)	Born	Weaned	
Rangiora High School, Rangiora	12,464	13505	51	106	4	4	—
	12,464	13506	85	255	8	8	4
Mahakipawa Pig Club, c/o. W. D. Bryant, Mahakipawa	13580	12689	108	402	11	8	2

Berkshires

G. T. Cowan, Rotomanu	18450	18371	99	348	12	9	3
Duncan McLean, Ltd., Greymouth	12818	15324	104	222	11	8	5
Rotomanu Pig Club, c/o. H. E. Hodgkinson, Rotomanu	19473	12798	54	207	9	5	—

Large Whites

P. Wafer, Barrytown	5671	5410	125	400	14	7	1
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PEDIGREE FARM SEEDS

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Sow only The Seeds of Success.

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Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m. on the following dates:—

November 6—"Field Work for the Coming Month," by Mr. P. S. Syme, Instructor in Agriculture, Department of Agriculture, Warkworth.

November 13—"A Discussion on Some Farming Topics," by Mr. J. M. Smith, Department of Agriculture, Wellington, and Mr. E. B. Glanville, Department of Agriculture, Auckland.

Ability to recognise common pasture plants and a knowledge of their habitat requirements are of fundamental importance in the study of grassland improvement. Following the best traditions of pasture research "Grasses and Clovers in New Zealand" (Bulletin 210, Department of Agriculture) should be of great value to farmers, research workers, and students. It is available at 1/- per copy (post free) from offices of the Department of Agriculture.

STUDIES IN FARM MANAGEMENT



A Hauraki Plains Farm

FARMING on the Hauraki Plains has its own particular problems: the area has been reclaimed from swamps by drainage and the heavy, wet land is liable to poach badly under dairy farming. Poaching of pasture land is overcome by providing narrow concrete walks on which the cows are driven from field to field and by regular rolling of the pastures to close the breaks caused by the hoof marks of cattle.

THE Hauraki Plains are part of the Hauraki Lowland, which is an area of flat alluvial land lying between the Colville Range on the east and the Maungakawa - Pakaroa - Hangawera - Pateroa Hills on the west; on the north it is bounded by the Firth of the Thames and in the south by the Tokoroa Plains. The Maungakawa-Pakaroa Hills run from Mount Maungatautari to Morrinsville and divide the plains of the Waikato and Waipa from the plains of the Piako and Waihou; at Morrinsville there is a break in the hills, but they appear six miles to the north as the maturely-sculptured Hangawera Hills. The plains consist of low, undulating hills, flat areas of light and heavy alluvial soils, and large peat swamps.

The Hauraki Plains are situated at the northern end of the lowland and were originally swamps in the drainage basins of the Waihou and Piako Rivers and the Waitakaruru Stream, and in the reclamation of the Hauraki Plains a great deal of stop-banking and river-dredging, as well as drain cutting, has been done. Work commenced in 1908. The channel of the Piako River has been improved, two extensive diversions of the river have been made, and the channel of the river widened. The flooding of the river has not been prevented altogether, but a large area of deep peat to the south of Kaihere is being utilised as a natural ponding-area, and this has the effect of retarding the flood-flow in the lower reaches of the river. The Maukoro Canal constructed from the sea at the mouth of the Waitakaruru Stream collects the water

from the western hills; the Awaitei Canal drains the Awaitei Basin and discharges into the Piako at Kerepehi; the Ngarua Canal joins the Piako at Kaihere and provides the drainage for a large area of peat land. The stop-bank system commences on the fore-shore of the Firth of the Thames and

By
A. V. ALLO,
*Instructor in Agriculture,
Thames.*

extends up both banks of the Piako as far as Kaihere; in addition, stop-banks have been erected on the Waitakaruru, Maukoro, and Awaitei Canals, as well as round the Kerepehi Block. The main drains for the removal of internal water have generally an easterly or westerly flow into rivers or canals, and each holding has an outlet drain on one or more of its boundaries. The bulk of these drains have practically an even grade, and if it were not for the range of the tides gravity drainage would be almost impossible. Wherever the drains cross the line of stop-banks automatic flood-gates have been constructed. The drainage of low-lying areas during flood periods has been improved by pumping and a large centrifugal pump has been installed at the junction of the Awaitei and Reservoir Canals. The deep-peat areas have proved most difficult to reclaim, for loss of level through subsidence of the drained peat

has caused large areas to be withheld from settlement.

HAURAKI PLAINS COUNTY.

Dairying is the chief farming industry in Hauraki Plains County. In the 1942-43 season there were 115,215 acres in occupation, of which 92,369 acres were in sown grass and 948 acres in annual crops: pasture land harvested for hay and silage amounted to 6,816 acres. There were 40,235 cows in milk, 25,092 other cattle, and 23,979 sheep shorn.

The average rainfall over the past 25 years is 44in. per annum and for the past five years the annual rainfall has been:—

	Inches.
1939	44.14
1940	41.52
1941	48.93
1942	35.71
1943	40.28

There are no large towns, the community centre of the area being the township of Ngatea, situated on the main Paeroa-Auckland highway. Roads in general are good, the main road to Auckland being tar-sealed.

The county contains three main soil areas (see map page 299). The alluvial and meadow soils are the most productive, whilst the peaty soils and peats are of lower fertility; the hill country to the west is only partially developed.

The alluvial and meadow soils have been built up of fine silt carried down to the sea by the rivers and returned to its present position by tidal action. During the course of years these deposits slowly rose above sea level and assumed a natural vegetation cover ranging from raupo, rushes, flax, and manuka to cabbage trees and kahikatea. The more rapid silting near the rivers caused lagoons to form, which were filled with peat, giving rise to the peaty soils and peat areas.

A HAURAKI PLAINS DAIRY FARM.

The problems of farm management and production on the Hauraki Plains

can be best seen by examining the layout and management of a typical dairy farm. The area selected may be a shade better than the average and was chosen simply because the farmer

has constantly been trying new and better methods of management and his experiences will prove of value to anyone wishing a closer knowledge of this district.

The farm, 74 acres in area, is on typical marine silt country in the Kerepehi district. When taken over by the present owner 15 years ago it was an undrained swamp of bush, scrub, raupo, and rushes. In fact, 90,000 feet of white pine were milled off the area during the initial stages of breaking in. Much stumping had to be done, the bulk of the stumps being matai and white pine.

Drainage

It has been found with all this country that the main problem lies in providing adequate drainage. As with all swamps, extensive drainage had to be carried out before the area could be developed at all. The problem on this farm was accentuated in so far as the ground level is slightly higher in the middle of the farm than it is at the front and the back, and the system of drains had to be planned to overcome this difficulty. The sketch plan of the farm shows the layout of the drains.

The farm, which is long and narrow, has three drains running down its length, one on each side boundary and the other down the centre.

Each of the 22 paddocks is bounded by drains, which are all double-fenced. In addition, the paddocks themselves are cut by shallow drains (only a few inches deep), which open on to the main fence-line drains. These shallow drains, situated about one chain apart, are very wide, so that they may be crossed by farm implements.

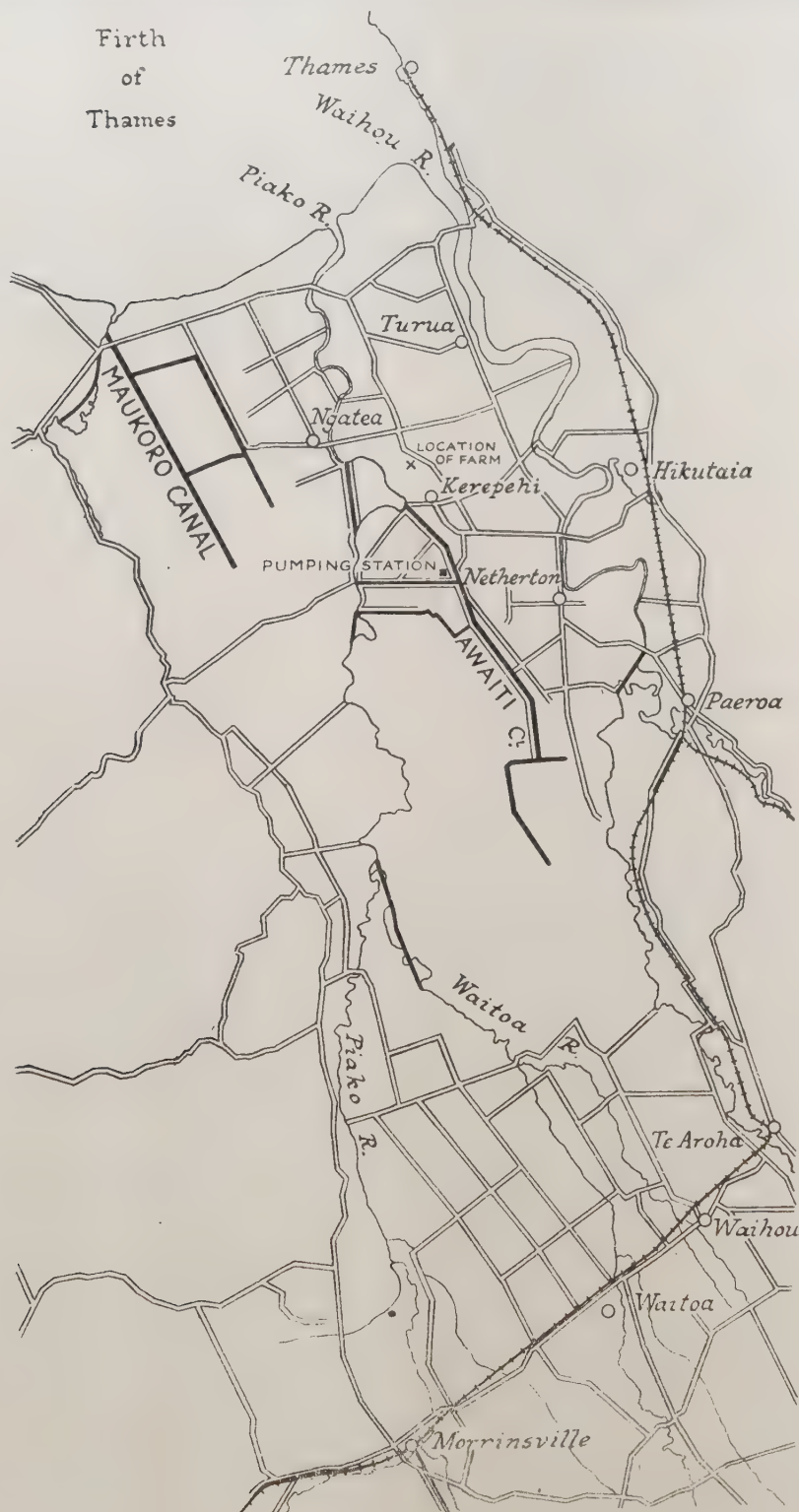
Pasture Establishment

The farmer found that once he had his land drained there was no difficulty in getting his pasture established. The area has all been in grass for several years and the pastures are particularly good, and a splendid advertisement for the fertility of the country. The seed mixtures used have varied somewhat during the years, the farmer altering his mixture as his experience of the country increased. His last sowing was a mixture of certified perennial rye 28lb., certified white clover 2lb., paspalum 10lb., timothy 2lb. per acre. There is ample strawberry clover in the pastures as a result of earlier sowings. Taking the pastures as a whole, the dominant species are ryegrass, white clover, paspalum, strawberry clover, cocksfoot, timothy, and fog, while the main weeds are docks, some rushes, flatweeds, and a little pennyroyal and buttercup.

The farm is subdivided into 22 paddocks, ranging in size from $2\frac{1}{2}$ to 6 acres. Shelter in the form of pampas hedges and plantations of bluegums and macrocarpas has been provided to some extent, although this feature of the farm could, with advantage, be extended.

Working the Farm

As may be seen from the plan of the farm, it lends itself admirably to being



worked from one main race. This is 4ft. 6in. in width, fenced on either side, and is paved with a concrete strip 21in. wide. The centre main drain runs alongside this race, which is perfectly negotiable in all weathers. Without this concrete strip it would become a sea of mud in the winter. All the paddocks between the cowshed and the back boundary lead off this race. Gates are so swung that they open out into the race, which is thus blocked when the gates are opened. Consequently, stock automatically go into the correct paddock, and do not wander down the race past this paddock.

In addition to the stock race, the farmer has had to devise some method of taking implements to the back of the farm. If the diagram of the farm is studied, it will be noticed that the drains branching out from the centre drain towards the side boundary drains do not go right up to these drains, stopping short about 14ft. This 14ft. is closed by a Taranaki gate. Thus, if the farmer wishes to take his tractor to the back of the farm, he proceeds down one of the side boundary fences, going through these Taranaki gates. Thus a great deal of culvert construction has been obviated.

All paddocks are rotationally grazed, the farmer's practice being to shift his stock into a fresh paddock daily. Regular harrowing is carried out and paspalum is topped in the summer when necessary. Ten acres of hay are cut yearly and are baled by an outside contractor. No ensilage is made, nor is any cropping done. In fact, the

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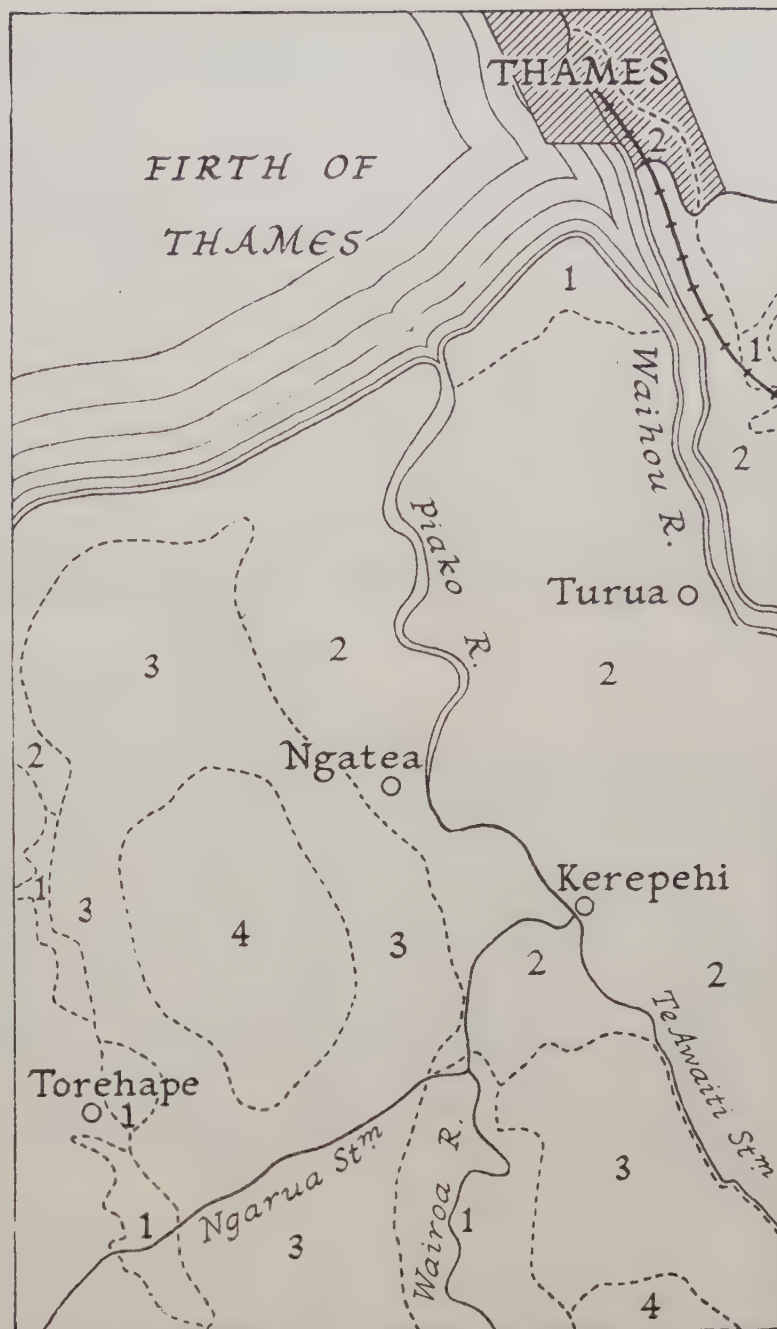
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amount of cropping done on the Plains is negligible. A few acres of maize and pumpkins are grown by some farmers, but in general grass is the sole mainstay of the stock.

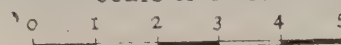
Winter Run-off

In common with most Plains farmers, the farmer has found it necessary to purchase a property on drier country for use as a winter run-off. If such a run-off were not used, there is too great a danger of pastures being badly poached during a wet winter. The run-off attached to the farm under discussion is situated in the Patetonga



Legend	
Alluvial soil	1
Meadow soil	2
Peaty soil	3
Peat	4
Railway line	+

Scale of Miles



ROLLING PASTURES

FEATURES OF DAIRY FARMING



Poached pasture.



Shallow surface drains.



Pasture rolling.



Concrete path.



Effect of rolling.



Milk trolley.

district and is 43 acres in area, all in pasture. The in-calf heifers, yearlings, and all young stock after weaning are kept on this area until they come into profit. In addition, the dairy herd is grazed there from mid-June until the end of July, when calving commences. There is always ample feed on the block during the winter, and the farmer does not find it necessary to cut any hay on this section.

Spring Pasture Management

It is now necessary to deal rather fully with the problem of spring pasture management on the marine silt country. As may be imagined, the soil is of very fine texture and poaches badly in wet weather under conditions of moderate stocking. Unless suitable methods of pasture management are adopted, the pastures on a farm may be very quickly ruined. The problem resolves itself into one of removal of surplus water and preservation of the sward.

The farmer has found that his system of open drains along all fence lines, coupled with the series of shallow drains in each paddock, has been successful in removing the bulk of his surplus water.

Of recent years he has introduced the practice of rolling in the spring, with the purpose of levelling off the surface of the ground after it has been poached by stock. Such rolling is done while the land is still wet. In fact, the ground cannot be too soft, provided it can carry a tractor fitted with wheel extensions. A Cambridge roller is used, although district opinion is at variance regarding the type of roller that gives the best results. Some farmers use a heavy concrete roller weighing several tons.

However, the idea behind rolling is not so much to consolidate the ground

as to level off the surface after it has been pugged by stock. The heavy roller has a serious disadvantage in that it can be used only when the ground is drying out, on account of its weight, whereas the light roller may be used when the ground is very wet, thus extending the period of rolling. Because of the reasons herein stated, opinions are now tending to swing towards the use of the lighter type of roller.

The farmer has found that his system of rotational grazing has very much reduced poaching, as stock are never in a paddock long enough to poach it badly.

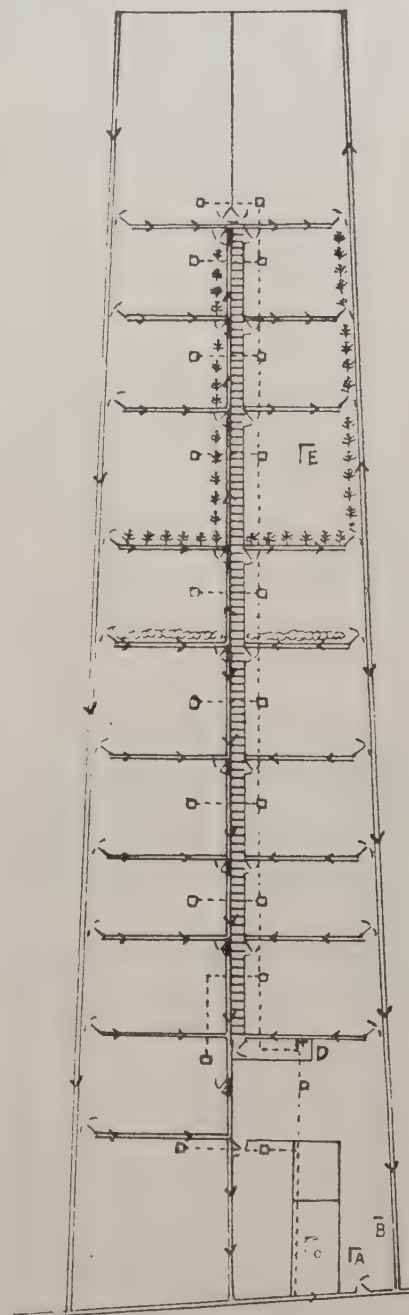
A further feature that the visitor to the Plains cannot fail to notice is the provision of a light tram-line from the cowshed to the cream stand. The use of such a tram-line and a light trolley helps to overcome the difficulty of getting milk or cream on to the road in wet weather, when conditions are very unpleasant for the use of a cart or sledge. On the farm under discussion the rails are made of timber although old tram or railway lines are sometimes used.

Fertilisers

Owing to the high natural fertility of this country, very little liming or topdressing has been carried out. The farm we are studying has never had any manure or lime applied, although the farmer is now considering applying a dressing of lime. The practice of liming on the Plains has shown a tendency to increase of late years, and good results have been obtained not only in the pastures, but also in the health of the stock. A dressing of 6-10cwt. of lime per acre would be of great benefit to the average Plains farm. Once phosphatic fertiliser becomes available it is considered that there will be a considerable increase in its use, as many Plains farmers have obtained good results from the use of phosphates. Although the ori-

ginal fertility of the marine silts is high, farmers cannot keep producing off it year after year without depleting the soil of phosphates, and it is far wiser to topdress before the land is dangerously low in phosphates.

PLAN OF FARM



KEY TO PLAN OF FARM:

- Drain (all drains double-fenced).
- Direction of flow of water.
- Fence lines.
- Bluegums and macrocarpas.
- Pampas hedge.
- Gates.
- Water pipe-line.
- Water troughs.
- Bridge over drain.
- Main race.

A. Garage. B. Shed. C. House.
D. Cowshed. E. Hay shed.

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Production and Stock

Finally, and most important of all, let us consider the production of this farm. This season the farm is running 52 grade Jersey cows and one pedigree Jersey bull on the main farm, and 35 in-calf heifers and 13 yearlings on the run-off. No pigs are carried, as the farmer supplies whole milk to a cheese factory. Indeed, the pig population on the Plains is comparatively small, as the bulk of the farmers supply cheese factories, while many are of the opinion that conditions are too wet for pigs. However, it is considered that more pigs could be carried, using whey in conjunction with roots and concentrates. No horses are run on the farm, all traction power being provided by a tractor.

During the past three seasons production has been as follows:—

1941-42 13,000lb. butterfat from 43 cows

1942-43 13,700lb. butterfat from 45 cows

1943-44 14,300lb. butterfat from 52 cows

In this connection, it should be mentioned that of the 52 cows milked this season 18 are first-year heifers, comprising a new line introduced by the farmer into his herd. The usual replacements on the farm are eight heifers yearly. During the three years in question the production averages out at 219lb. fat per cow and 183lb. per acre.

To produce these returns the farmer has the assistance of his daughter, who helps with the milking, and also does light jobs on the farm.

Implements and Buildings

The range of implements, although small when compared with that of farms in other districts, is ample for the efficient working of this farm. There is a 16 h.p. tractor fitted with wheel extensions for use when rolling in the spring, a Cambridge roller, set of grass harrows, tractor mower, and konaki.

The range of buildings is also small, comprising a good modern home, garage, tractor and implement shed, cowshed with four-cow plant and all concrete yards, and a large hay shed.

From the description of this farm it is obvious that here we have an efficient unit being reasonably well managed. The production is steadily increasing year by year, with the farmer's aim being a herd of 65 cows. He has not been afraid to experiment in an endeavour to improve his methods, and his farm to-day is an example of what can be done by hard work coupled with an intelligent appreciation of the many problems of farm management peculiar to this soil type.

Thanks are expressed to the Director, Soil Survey Division of the Scientific and Industrial Research Department, for data for the soil map, and to the Lands and Survey Department for drawings.

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DEPT. OF HEALTH



TONSILS!

— Useful or Dangerous?

This question puzzles parents. Tonsils act as a filter, protecting the body from harmful germs, so long as they remain healthy.

But tonsils may get damaged and then they may become enlarged or septic. Mere enlargement does not usually matter, but if they become pockets of septic material which is slowly absorbed by the body—that's another story.

Tonsils infected in this way poison the body. They cause repeated attacks of sore throat—nasal catarrh—earache—bronchitis—proneness to coughs and recurrent colds—malnutrition, in time—lack of development—anaemia—lassitude—headaches.

Enlarged tonsils seldom need removing because of size alone—unless they become big enough to block the throat and cause mouth breathing, thickness of speech, and restless sleep. If these things are happening—disease or mechanical blockage—**HAVE THE TONSILS OUT.**

If you have a healthy throat, and want to keep it that way, exercise daily in the fresh air, eat a balanced diet, and use your handkerchief freely to keep the nasal passages clear.

FOR A HEALTHIER NATION

Conservation of Farm Machinery



Plough Setting

Through faulty setting the draught of many tractor ploughs in everyday use on farms is as much as 300lb. more than it need be. An extra 150lb. of draught at ordinary ploughing speed means that the tractor must develop an extra horse-power at the drawbar, and that it will use an extra gallon of fuel per day without useful return. It follows that faulty plough setting is the cause of many tractors wasting as much as two gallons of fuel per day; poor ploughing also results. Both fuel wastage and poor ploughing can be avoided by observing the following simple rules:—

THE width of furrow must be suitable for the required depth. With general purpose ploughs the width of furrow should be at least half as much again as the depth of work, i.e., the furrow slice should have at least 3in. of width to every 2in. of depth. With digger ploughs the furrow slice can be as deep as it is wide.

Setting the Hitch

With the plough hitched to the tractor as you are accustomed to use it draw the plough into work, and make sure that the front furrow is exactly the same width as all the others. Then stop and see whether your hitch corresponds with Fig. 1, particularly as regards the following points:—

The main plough drawbar should be hitched as near to the centre line of the tractor as possible, and should be parallel to the furrow wall. The hitch adjustment should be in the centre of its travel.

If your hitch does not correspond with the diagram, uncouple it without altering the relative positions of tractor and plough, and couple it up again as follows:—Attach the front end of the plough drawbar to the central hole of the tractor drawbar

plate; and the rear end to the hole in the hake bar, which brings it most nearly parallel to the furrow wall. Put the hitch adjustment in the centre of its travel, and attach the end of the cross-bar to the farthest hole that it will reach on the hake bar.

The plough should now follow true behind the tractor; if it "crabs" or swings to the left or right at the rear, the hitch should be moved on the tractor drawbar in the opposite direction. That is, if the plough swings to the land the hitch should be pegged towards the furrow side of the tractor drawbar and lined up again as in Fig. 1. If the plough swings towards the ploughing, the opposite applies. In some cases side thrust can be taken in the rear wheel to check "crabbing" to land.

Viewed from the side the hitch should slope up slightly from the plough to the tractor as in Fig. 2. This setting should make the heel of the rear landside run lightly along the furrow bottom. If the heel rides clear, the hitch should be lowered on the plough; if it presses too hard, the hitch should be raised.

Adjust the weight carried by the rear wheel so that the wheel can be stopped by grasping it with the hand while the plough is at work.

Disc Coulters

Set these just deep enough to cut a clean furrow. If they are too deep, they will "carry" the plough, preventing penetration, and causing excessive wear in the coulters bearings. In hard land coulters should be set shallow and well behind the share point; in normal work they can be set practically over the point of the share. Coulters should be set so that there is just a little clearance between their cut and the landside. Too much clearance spoils the look of the work, while a coulters set too narrow (so that the landside breaks the furrow

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wall) will greatly increase the draught.

Skim Coulters

Skim coulters should be set just deep enough ($1\frac{1}{2}$ -2in.) to ensure that no grass is showing when the furrow slice is turned. They must be well forward, so that the skimming is taken off the furrow slice **before** it is lifted; and they should be set as square to the discs as is necessary to ensure that the grass skimmed off goes straight into the furrow bottom. Finally the point of the skim should be set as close to the disc as possible, without actually touching it, so as to prevent blocking. If skims are set to take too much off, or if they are not square enough, so that the skimmings do not go straight into the bottom of the furrow, the ploughing will be left "hollow" underneath—although it may look all right. If the skims are too far back, they will break the furrow slice and leave ragged work.

When conditions are such that skims cannot be made to work satisfactorily, the top of the disc coulter (if of the single-arm type) should be tilted about two notches towards the ploughing. This will undercut the furrow wall slightly and cover the grass better. But "tilted" coulter should not be used too frequently, since they cause increased wear both in the coulters bearings and on the shin of the plough.

Mouldboards

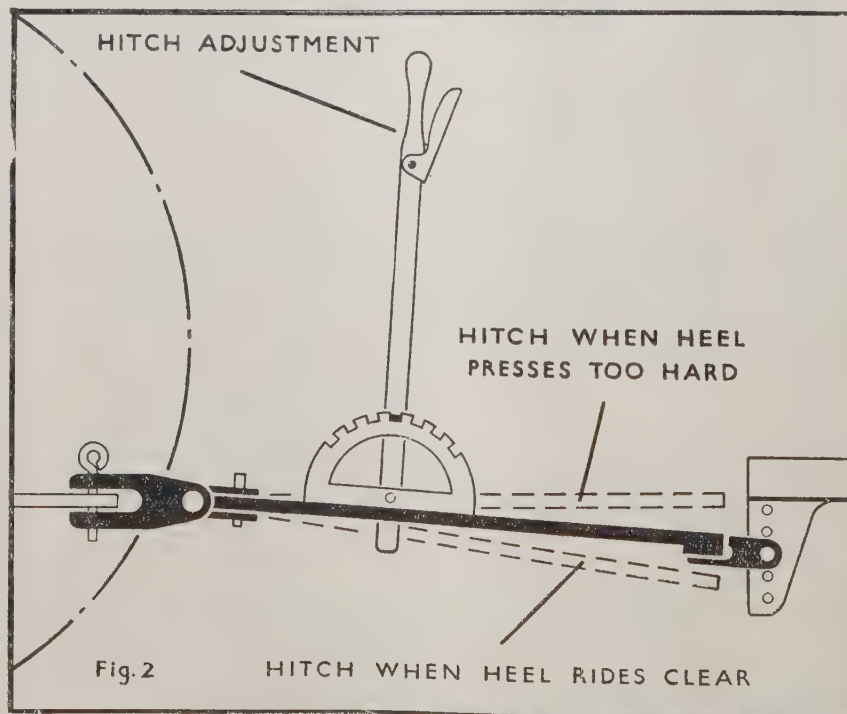
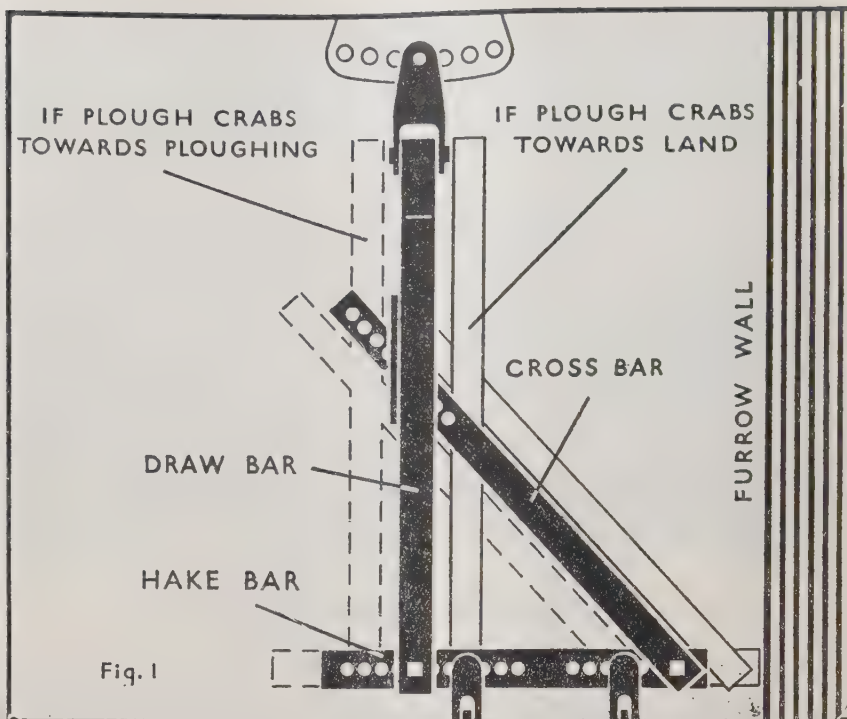
Never work a plough with the mouldboards pushed out too far, as this greatly increases draught. So long as the furrow slice turns satisfactorily work with mouldboards drawn in as far as possible. When furrows roll back or stand on edge it is usually because the furrow width is too narrow for the depth. The trouble cannot be cured by pushing out the mouldboards.

All the mouldboards should be adjusted equally, so that the measurement from the landside to a given place on the mouldboard is the same in every case.

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Milking Shed

construction is the subject of Bulletin No. 154, available free from offices of the Department of Agriculture. Comprehensive plans, illustrations, and materials schedules are included, with extracts from the Dairy Industry Act and regulations governing milking shed construction and equipment. The bulletin is a complete and up-to-date guide for the dairy farmer.



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Sugar Beet for Wintering Pigs



Feeding Practice on Hawke's Bay Farm

For twelve years the owners of the Mahora stud of Large White pigs have been growing sugar beet for wintering pigs of all ages, but are now convinced that the best returns are obtained when fed to sows and litters, particularly now, when pollard and bran are specifically earmarked for the poultry industry.

ON most dairy farms some of the sows farrow in June and July when milk is scarce and when a bulky supplement is needed, and it is here that sugar beet has proved its worth. In utilising this crop the practice employed differs from the usual in that practically no use is made of the tops. These are removed with a hoe while the crop is still in the ground, and after lifting the roots are stored in clamps near the piggeries for later use. Probably better results would be obtained by leaving the crop in the ground and feeding the tops, with the roots, to the sows and litters, but on account of the limited area of the farm the early harvesting of the roots is practised so that the cropped area can then be returned to grass.

Should bran be available, 1lb. is added to the above for medicinal purposes.

From this mixture the average litter weight per piglet at 8 weeks is 35lb., but later litters, when milk is plentiful, average 6 to 8lb. better.

Prior to the growing of sugar beet pumpkins and mangolds were used for winter feed, but with indifferent results. Small areas of these crops are still grown, however, but they are

Above: Left, The home-made digger. Right, Sugar beet as lifted by the digger.

used for larger stores to conserve the sugar beet for the sows and litters.

The difficulty of harvesting sugar beet has deterred many farmers from growing this crop, but this has been overcome here by utilising a home-made digger, which, when drawn by a light tractor, efficiently lifts the roots and leaves them ready for carting off.

The digger is made by attaching a slightly curved plate of steel to the beam of an ordinary single-furrow mouldboard plough, the plate being 18in. wide, 15in. deep, and sharpened on the front edges.

—G. A. BLAKE, Instructor in Agriculture, Hastings.

For Sows With Litters

The usual practice of feeding both tops and roots to store pigs during the autumn is not carried out on this farm, the sugar beet being specifically grown for the sows with litters, from which usage they consider they get the best results. It is well known that, given good treatment, a pig at four months will weigh twice its weight at two months, hence the policy is to reserve the sugar beet to produce heavy weaners.

The following is the average daily ration fed to a sow and litter:—

- 15lb. sugar beet.
- 2lb. barley.
- 1lb. meat meal.
- About six gallons of skim milk.

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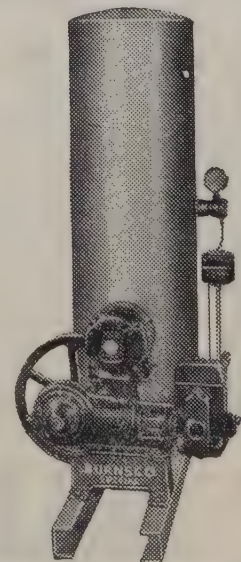
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ALLIS-CHALMERS



The problem of supplying New Zealand farms with plenty of water does not usually present really serious difficulties. In most parts of the country a supply of water can be obtained on every farm, either from overground streams, from underground water-bearing strata, or as collected rain water.

THE surface of New Zealand is well dissected by rivers and streams, and these provide some of the water required for farm purposes. The rainfall of most districts in New Zealand is quite sufficient to keep many overground streams running permanently, and underground reservoirs are replenished frequently. Very deep boring such as is necessary in many parts of Australia is seldom, if ever, needed under New Zealand conditions. Some portions of the low-rainfall areas of Central Otago are under irrigation, and the low-rainfall areas of Canterbury are watered by irrigation ditches, the water being brought from snow- and rain-fed rivers rising in the central mountain system.

Importance of Pure Supply

A sufficient quantity of reasonably pure drinking water is essential to the maintenance of health of all livestock. Copious supplies of pure, cool water are particularly essential in dairying districts, for not only do dairy cattle require much more drinking water than do other stock, but also large amounts are needed for cooling the milk or cream, and for washing the milking plant, the cans, and the floor of the milking shed.

The harmful effects of drinking impure water are less noticeable in animals than in human beings. In man, epidemics of cholera, enteric, typhoid, and dysentery have from time to time been traced to polluted water supplies. In animals the possibilities of the spread of diseases such as contagious abortion of cattle, Johne's disease, tuberculosis, strangles, and influenza of horses must be entertained.

By

K. M. MONTGOMERY,
Fields Instructor, Te Kuiti.

Both man and animals are liable to infection by drinking water contaminated by the eggs or larval forms of certain worms and of some other parasites, such as liver flukes. Infections which may be spread or perpetuated by unsuitable watering facilities for stock are stomach and lung worm of horses, cattle, sheep, pigs, or poultry. Moist or wet conditions favour the longevity of the infective stages of these parasites, and favour the development of snails and slugs, which are intermediate hosts for certain of them. Outbreaks of round worm infestation of pigs, a common trouble in New Zealand, have been traced to the drinking of water from shallow ponds or other unsuitable drinking places which have been subject to heavy pollution with infested animal manure.

For domestic and for dairy purposes reasonably pure water is essential. In addition to the risk of introducing disease-producing bacteria in milk, polluted water has frequently been responsible for abnormal changes in, and rapid decay of, milk, cream, butter, and cheese. While pigmentation of milk, slimy and rosey milk, fermentation of cream, and the development of bad flavours may be the result of various kinds of contamination, they have periodically been traced to the presence of yeasts, moulds, bacteria,

and other impurities in the water supply.

Quality of Water

Water for dairying purposes should be clear, odourless, neither strongly acid nor strongly alkaline, free from excessive organic and mineral matter, and as free from micro-organisms as possible. It is only reasonable that every effort should be made to bring all water which is likely to come into contact with dairy products up to the standard laid down for drinking water, as it is only by safeguarding against all possible sources of pollution that the presence of undesirable bacteria can be avoided.

Water containing appreciable quantities of iron causes endless trouble by blocking water pipes and coolers and thereby reducing the flow of water. Such water is also objectionable for domestic use. For laundry and other household purposes iron-bearing waters can usually be improved by aeration, followed by a period of rest to settle the precipitate. In the case of running water aeration can be accomplished by allowing the water to flow over cascades or weirs. If necessary, the iron can be precipitated by

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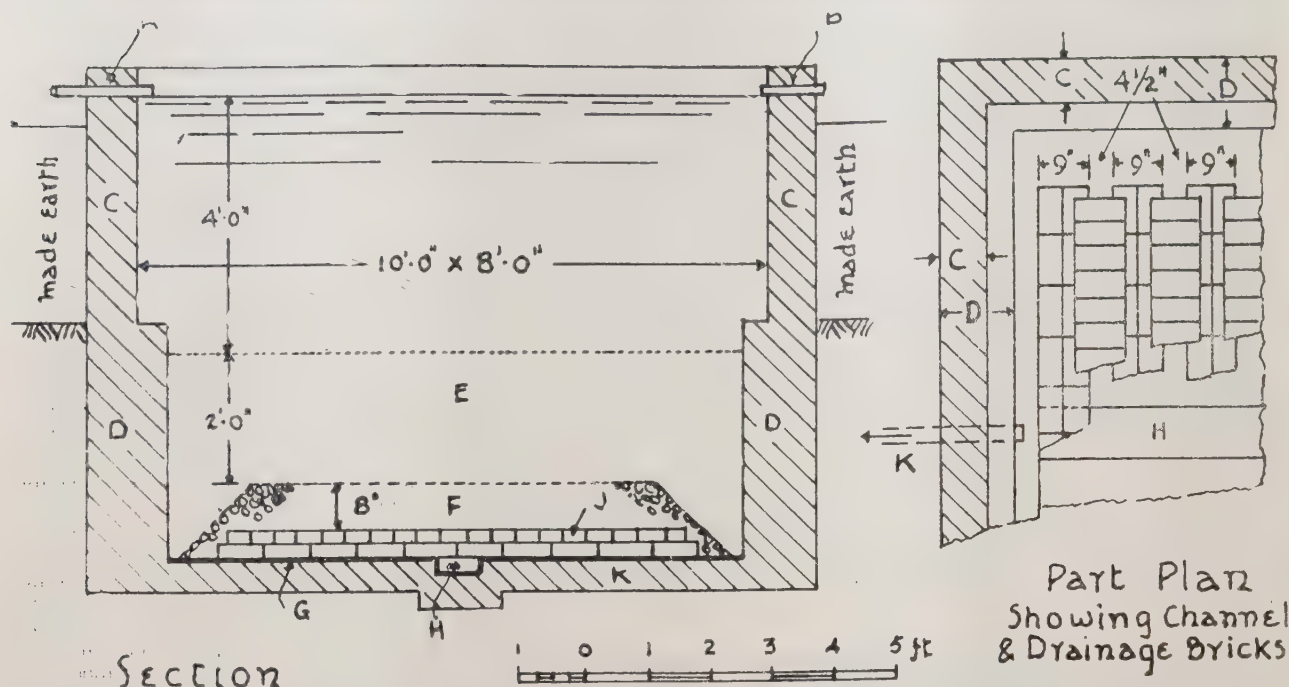
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SECTION
Part Plan
Showing Channel & Drainage Bricks
 A. Inlet. B. Overflow. C. 9in. brickwork. D. 14in. brickwork (set in 4 : 1 cement mortar). E. Fine sand with coarse sand at bottom. F. Graded gravel. G. $\frac{1}{2}$ in. cement plaster coat sloped 1in. in 4ft. H. Filtrate channel, 9in. wide. J. Loose brick drains. K. 6in. brickwork set in cement mortar.

the addition of lime or aluminium sulphate to the water, and removed by filtering through sand. Such a filter can be quite easily constructed, and should be placed so that the water passes through it on its way to the storage tank. Such filters may sometimes with advantage be interposed between roof-water collecting pipes and the tanks.

Hard waters also are undesirable, as with them it is more difficult to clean the dairy plant and utensils. The term "hard" is applied to those waters which do not readily form a lather with soap. This is due to the presence in the water of certain mineral salts of calcium and magnesium. Hard waters have been held responsible for certain digestive troubles and malnutrition in animals; they are unsatisfactory for use in mixing dips and certain disinfectants, and they form a scaly deposit in boilers and other containers in which water is boiled.

Some waters can be softened by boiling, but this method is too costly for the treatment of all the water required on farms. "Temporary hardness" of water which is due to the presence of bicarbonates of calcium and magnesium can be removed by the addition of slaked lime. This process also removes some of the organic matter from the water and thus helps to purify as well as soften the water.

The addition of slaked lime to the water for the milking herd is an easy method of supplying calcium as a preventive against milk fever, which has been proved to be caused by, or at all events attended by, a lack of available calcium in the blood at or near calving.

"Permanent hardness," i.e., hardness due to the sulphates and chlorides of calcium and magnesium, can be removed by adding washing soda. The quantity of lime or soda necessary to soften a particular water depends on the degree of hardness of the water, and this can be determined only by analysis. A highly satisfactory method of softening "hard" water is to pass it through particles of zeolite minerals. This is the "permutit" process, and many water softeners of this nature are procurable. When the permutit material becomes inert it can be revived by immersion in a brine solution for 24 hours. A permutit water-cleaning plant has therefore a low operating cost.

Water for Fruit Farms

The water used on fruit farms for spraying purposes requires to be fairly pure. If the spraying water is temporarily or permanently hard, or if it contains suspended matters such as clay, or suspended or dissolved organic matter, difficulty is likely to arise when preparing sprays. The presence

of the above materials in the spraying water frequently gives rise to severe foliage injury. Remedial measures are detailed in "Plant Protection," by Dr. G. H. Cunningham, a handbook which is available for the use of New Zealand fruitgrowers. Gritty material in spraying water is very detrimental to the power-driven pumps used to deliver sprays under pressure.

Quantity of Water

Available information indicates that a stall-fed cow requires four gallons of water for each gallon of milk she produces, and that when dry she needs from six to eight gallons per day. The corresponding figures for cows under ordinary New Zealand conditions are not known, but if we assume that a cow eats 120lb. of pasture per day containing 80 per cent. of moisture she will derive from the pasture nine and a half gallons of water. Thus a deep-milking cow with a total requirement of twenty gallons per day will require ten and a half gallons of drinking water in addition to the water she takes in as grass. Naturally, in warm weather a greater volume of drinking water should be supplied.

The volume of water needed for cooling purposes depends on the temperature of the water used; in warm weather, if water at a temperature of 60 deg. F. is used, approximately from

six to eight gallons of water is needed to cool each gallon of milk, and about six gallons to cool each gallon of cream to the desirable temperature of approximately 65 deg. F. Since, on separating, the volume of cream obtained is about one-tenth of the volume of the original milk, it follows that farms supplying cheese factories require more than ten times as much water for cooling purposes as do those supplying butter factories.

Approximately eighty gallons of water per day are needed for flushing out the average milking plant and for washing and sterilising the milking plant and utensils. The above quantity allows for the use of twenty gallons of cold water and twenty gallons of hot water for cleaning the milking plant at each milking, but these quantities will vary considerably with the size of the machine.

The amount of water required for washing the milking shed floors and yards is difficult to estimate, but better work is done with a good volume of water and a broom than a small-nozzled high-pressure hose. It is calculated that an average dairy farm sup-

plying a cheese factory and with fifty cows in full milk requires at least 1200 gallons of water per day. A similar farm supplying a butter factory requires between 800 and 1000 gallons per day. If the water used for cooling is not pumped up to the storage tanks through the cooler, or saved for washing the shed floor, additional water must be provided. If sheep are being depastured and have to be watered from a trough, approximately one to one and a half gallons per day must be allowed.

Sources of Supply

The source from which water is obtained has a distinct bearing on its purity, palatability, and suitability for consumption for household and dairy purposes. The characteristics of water from a particular source are influenced largely by local conditions. Where streams have as their source large springs the water is usually regarded as being exceptionally pure, but it is not necessarily so. Springs and seepages are usually caused by the emergence of ground water at the surface, and under certain conditions this

ground water is liable to be polluted. In uninhabited hill country it will be pure, while in inhabited country it may be contaminated by the discharge from domestic and industrial sewerage, dead animals, or dip discharge, and thus will be highly dangerous.

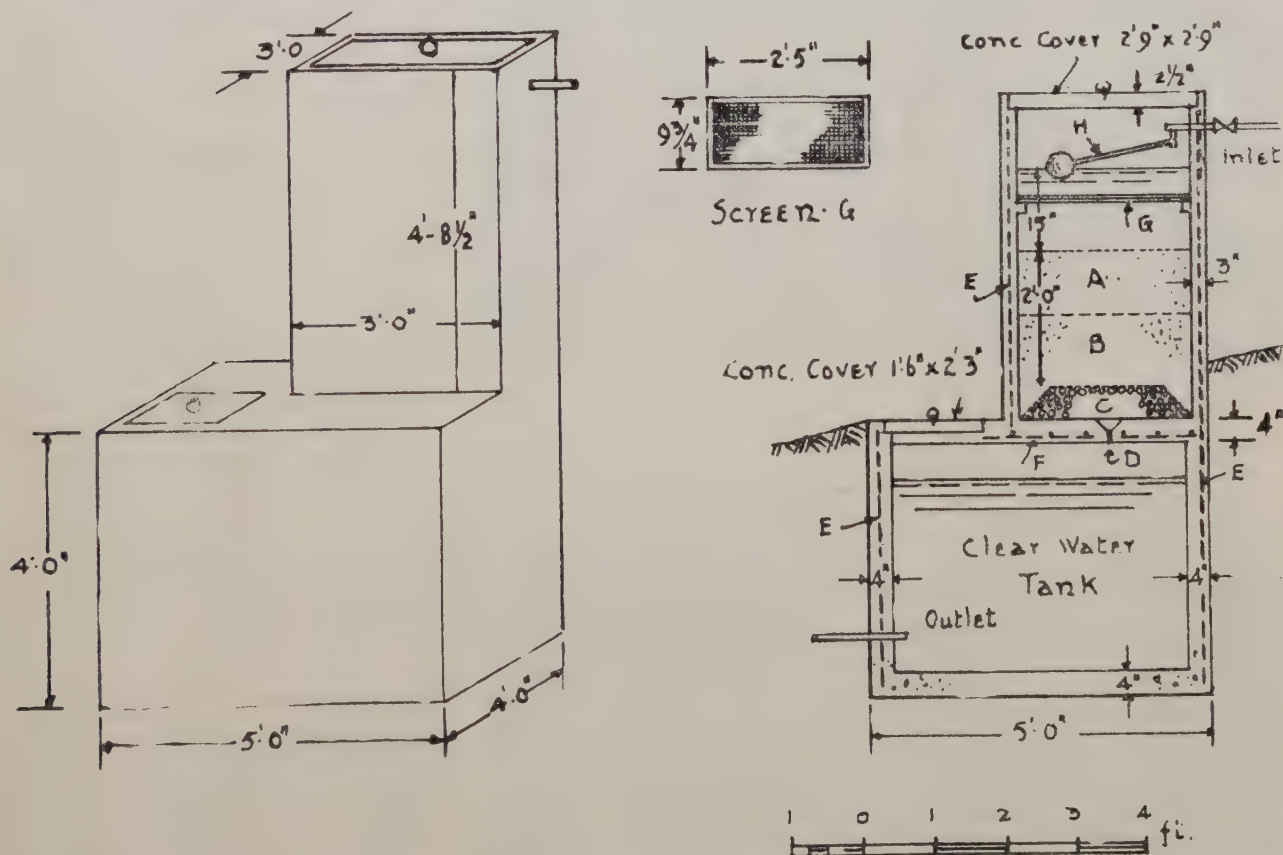
Rain Water

The suitability of rain water for domestic and dairying purposes varies according to the purity of the atmosphere, the nature of the collecting surface, the frequency of rains, and the storage system. Where rain water is utilised lead vessels or pipes should on no account be used.

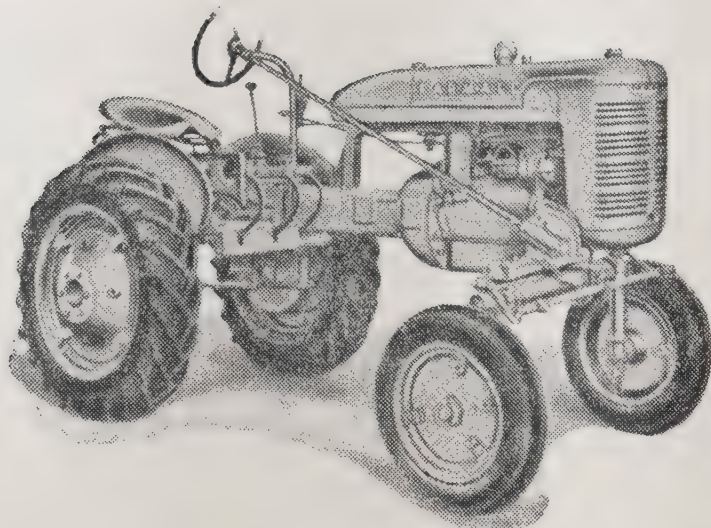
On most farms rain water caught from the roofs of houses is used for household purposes, but frequently insufficient tanks are provided. More use should be made of this ready source of supply, especially where the catchment areas, i.e., roofs of the house, cowshed, or other buildings, are on a rise and there is good gravitation for the water over the farm.

Large concrete cisterns sunk into or built above ground form an excellent method of storage. The advantages of

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building a cistern above ground are ease of construction, easy detection of leaks, and avoidance of pollution from surface water. Where the cistern is placed in an elevated position relative to other parts of the farm the water may be distributed by gravity.

Rain water caught from roofing has the disadvantage that it is likely to be polluted by dust, dead leaves, and bird droppings, and strainers should always be provided at the inlets of tanks and cisterns. The spoutings should be kept clean, and the first water run off should be run to waste, and only the later and relatively pure water should enter the cisterns. There are automatic appliances for doing this. The cisterns should be kept covered and should be cleaned out periodically.

In uncovered tanks a green slime often appears on the surface of the water. This may be removed by the addition of copper sulphate in the proportion of one ounce of crystals to 10,000 gallons. The crystals should be dissolved in water before being added to the cistern. In this proportion the compound is not injurious to human beings or to stock. The same results may be obtained by adding potassium permanganate until a very faint tinge of pink is observed in a tumbler of the water.

Races

In some agricultural and sheep-grazing districts of the Dominion where the rainfall is low and underground water is difficult to obtain water is supplied by leading it in races from streams flowing from higher-rainfall areas. In these districts the race water is used for stock, whilst rainwater stored in tanks is usually employed for household purposes. The race method is a convenient way of watering stock; but in dry seasons sufficient water is not always available to fill all the subsidiary races. For stock consumption this water must always be considered as a possible source of infection by disease and worm parasites. For dairy purposes it is a very unsatisfactory source of water supply, as in summer time it is often useless for cooling purposes, and in the winter much trouble is caused by the races becoming frozen or choked with snow on the higher levels.

Wells

Wells may be of two types, i.e., dug or drilled. The efficiency of a dug well, which is really an underground storage tank, will depend on the flow of water, particularly that available during dry periods. Wells may be placed at any point where the water table is sufficiently close to the surface.

WATERING PLACES



Very Bad



Poor

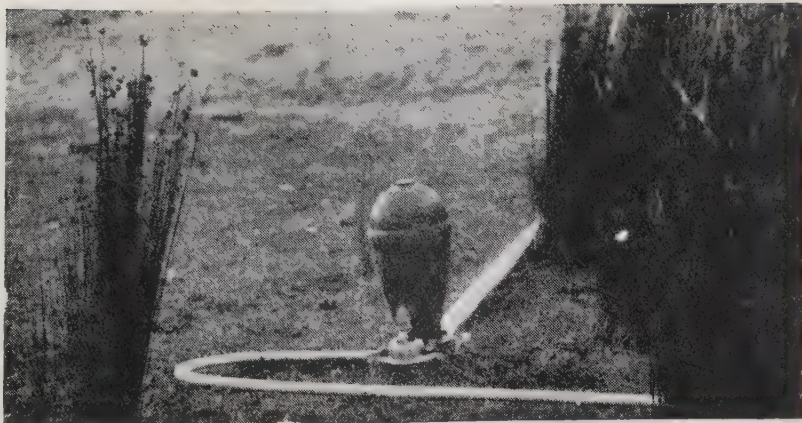


Good

They form a relatively cheap method of obtaining supplies of cool water, but if situated on peaty soils, or where the water is drawn from underground layers of peat, the water usually contains much iron, and dissolved or suspended organic matter.

The site for dug wells should be carefully chosen, as they may become polluted from surface and subsoil drainage. They should be situated with due regard to the movement of the ground water from sources of pollution, and every effort should be made to see that the ground surrounding them is kept as clean as possible, especially when they are dug in sands or gravel. Surface water should be prevented from flowing into the well by raising the lip above ground level. It has been estimated that the safe vertical depths at which surface bacterial pollution is effectively filtered out are as follows: Solid clay, 6ft., fine sand, 12ft.; gravel, indefinite.

Where possible a well should be so placed that it will strike water at a depth of not less than 15 to 20ft. This may mean that a well should be dug some distance up a slope rather than at the bottom, where the water may lie very close to the ground. If the water level suddenly rises a foot or more after heavy rain, or if silt, twigs, and other rubbish appear, it indicates that water is reaching the well by some channel which does not provide effective filtration. Such a well should



The hydraulic ram is an extremely cheap and reliable method of raising water.

be regarded with suspicion unless the surroundings are scrupulously clean.

Provision must always be made for the cleaning of dug wells. An inspection of the material which is found at the bottom of most wells after a few years will show the desirability of this. Owing to the accumulation of silt reducing the effective depth of the well, the flow of water and the storage capacity may be greatly decreased in volume so that cleaning and deepening the well may be necessary to ensure a sufficient supply.

Drilled wells or deep wells form an excellent source of supply for farms

on account of the permanence of their flow, and because the water in them is unlikely to become polluted except directly through the top of the well. Water in these wells usually has to pass through one or more strata of good filtering material, and as a result of natural filtration the water supply is fairly pure. In some areas, however, deep wells do not supply pure water. The water may be contaminated by dissolved minerals, or dissolved or suspended organic matter. It is important to keep surface water out of the well, and this can be accomplished by sealing around the top of the casing. On account of their small bore, drilled wells have little storage capacity and hence must be sunk until a good supply stratum is reached.

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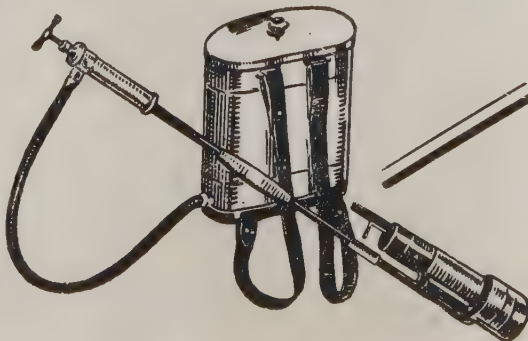
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Dams

Except where a weir is thrown across a stream or perpetually running race the usual type of dam constructed on the farm is not a good method of storing water. A common site is at the foot of a gully or below a small spring rising up through swampy soils. Unless they are built on a large scale and have a continuous flow of fresh water coming in, dams quickly become foul and afford a likely source of stock infection by internal parasites. Therefore, this method of storing water is not recommended except as a last resort.

Where it is necessary to rely on this type of storage it is advisable to fence off the dam and to plant trees around it so that the water will be kept cool. The stock should be supplied with a drinking place below the dam, and should not be allowed access to the reservoir. Algal growths may be removed by the methods suggested for treating rainwater tanks, but for the larger bodies of water the crystals are usually placed in sacks drawn through the water. Water fouled by silt and organic matter can be easily cleaned for stock requirements by coagulation

with certain chemicals such as alum and iron sulphate, but expert advice should be obtained regarding the methods of applying these substances.

Rams

The hydraulic ram is a simple and efficient automatic device for elevating water. Wherever a flow of water with even a slight fall can be obtained a portion of the water may be forced to a considerable height. The amount of water which should be available to drive the ram should be from ten to twenty times as great as the amount to be delivered by the ram.

The main factors which decide if a ram is suitable for elevating water to a particular position are: the working fall that can be obtained; the volume of drive water available; the height and distance the water has to be elevated; the quantity of water required per day. The pipe supplying the ram should have a fall of not less than about 1ft. vertically to 8ft. along the slope. Under these conditions the

height to which water may be raised is about equal to the sloping length of the drive pipe. The horizontal distance the water has to be driven is also a factor, as water pressure or head is lost by friction along the drive pipe line.

When considering the installation of a ram, the following figures should be noted:—

	2.	3.	4.	5.
Supply per minute needed to work ram gals.	2-3	2-4	3-7	6-12
Approx. delivery in gals. per hour (depending on delivery head)	10-15	10-20	15-35	30-60
Size of drive pipe	3"	1"	1 1/2"	2"
Size of discharge pipe	1 1/2"	1"	3/4"	1"

It has been found in practice that the fall, the discharge head, and the length of the drive pipe are closely associated in relation to efficient working.

Height to which water is to be raised above ram. ft.	Fall Required. ft.	Length of Drive pipe. ft.
20	3	30
30	4	30
40	5	40
50	7	50
60	8	60
80	10	80
100	14	100
120	17	125

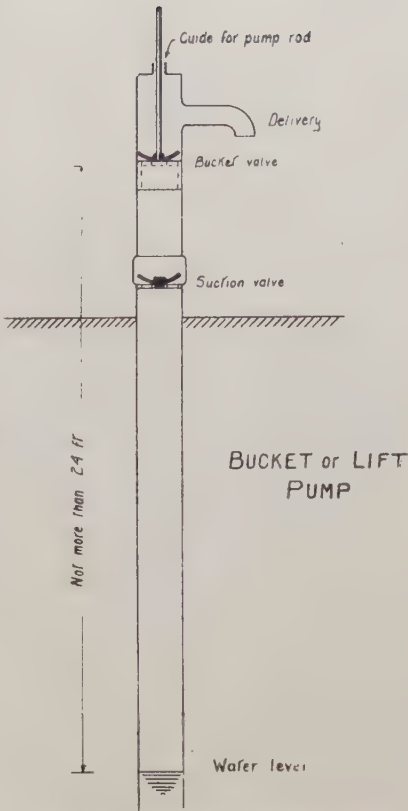
The ram should be securely fixed in position on a solid foundation. The drive pipe and discharge pipe should not be less than given above, and may with advantage be larger where long pipes are used. Bends in the pipes should be avoided when possible, but if a turn is necessary, bending the pipe is preferable to using an elbow.

Pumps

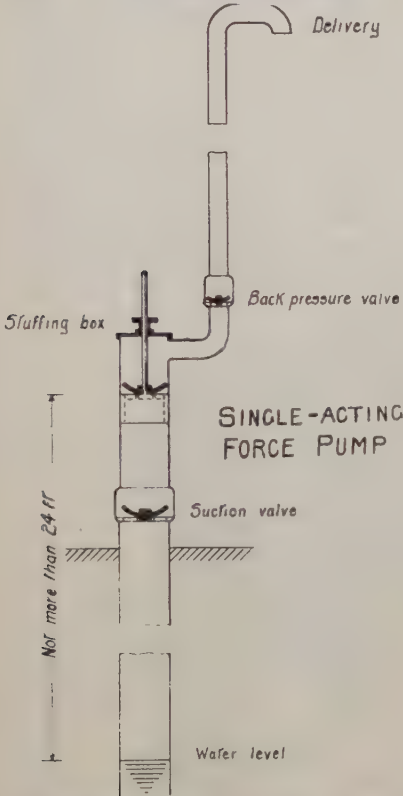
Where there is insufficient fall for a gravity system or for driving a ram, and where water must be raised from wells or streams, a pumping plant must be installed. It should be explained that no pump can raise water by suction more than about 25ft., though many pumps can force water much greater distances.

The two main types of pumps are: (1) Reciprocating pumps and (2) rotary pumps.

Reciprocating pumps are of two types, i.e., lift pumps and force pumps. Lift pumps can raise water by suction to a height of some 23ft. This type is very suitable for raising water the last few feet in an artesian well whose water does not reach the surface. A common form of the lift pump is the old-fashioned, iron-handled pump usually seen fitted above a dug well. Force pumps are designed to force

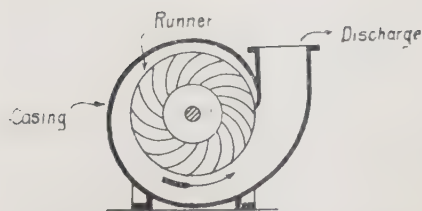


ACTION OF LIFT PUMP. Both valves shown open. On the up stroke the bucket valve closes, the suction valve lifts, and water is drawn into the pump cylinder. On the down stroke the suction valve closes and the bucket valve opens to allow the water in the cylinder to pass through. On the next up stroke this water flows to delivery.



COMBINATION LIFT AND FORCE PUMP. Valves shown open. The action of the lift pump portion of this combination is similar to that described with the lift pump. The up stroke of the pump piston forces water past the back-pressure valve to delivery. On the down stroke of the piston the back-pressure valve closes and prevents the water from the delivery pipe flowing back into the pump cylinder.

water a number of feet above its original level. These pumps should be located less than 23ft. above the water surface. Force pumps are frequently used in combination with lift pumps. The lift pump raises the water approximately 23ft. and the water is then further elevated by means of the force pump. Combination lift and force pumps are frequently used in deep wells where the permanent water level is more than 23ft. below ground surface. In their simplest form reciprocating pumps are described as single acting, and from these the water issues in spurts. Double acting pumps have additional valves and provide a more continuous flow, delivering water on every up and every down stroke. An air chamber or dome should be mounted on the delivery side of every force pump as an aid to smoothing the fluctuations of the load and maintaining a steady supply. The valves of reciprocating pumps wear quickly if the water is gritty. If a blockage occurs the delivery pipeline or pump



CENTRIFUGAL PUMP. Water enters at middle of casing parallel to shaft of runner.

may burst. The gland or collar through which the pump spindle passes should be practically watertight, but should not be tightened unduly.

All shallow well pumps and deep well pumps without submerged cylinders should be fitted with foot valves. The foot valve is attached to the lower end of the suction pipe, and its purpose is to prevent water once in the pipe from dropping back into the well. The ball type of foot valve should always be used if the water contains sand or grit.

Rotary pumps: Of these, the most important type is the centrifugal pump. This pump consists of a propeller rotating in a spiral casing. The rotary motion of the propeller sucks

water in from the supply pipe and whirls it out through the delivery pipe. This type of pump is particularly recommended where large quantities of water are to be pumped to relatively small heights. Centrifugal pumps should be placed less than 20ft. above the water surface. A centrifugal pump should be fitted with a good foot valve to reduce priming. Centrifugal pumps are not so liable to damage from grit as are reciprocating pumps, as there are no valves or pump cylinders to wear. If a blockage occurs, there is no great increase of pressure set up that might cause damage. This type of pump may easily be coupled directly to an electric motor. Centrifugal pumps are designed for certain heights and discharges, and when used under conditions other than those for which they are designed will not operate without loss of efficiency.

Automatic Pressure Outfits

Where electric power is available to drive any of the usual types of pumps an automatic pressure control device can be used in order to ensure continuity of supply. The water in the reticulation system is maintained in the neighbourhood of a predetermined pressure. As soon as water is withdrawn from the reticulation system

the pressure falls, and when it has fallen sufficiently the drop in pressure causes an electric switch to operate which restarts pumping operations.

The automatic pressure outfit eliminates the necessity of having water towers and overhead tanks. The pressure represented by the head of water in the raised reservoir is replaced by the pressure exerted by the electrically-driven pump. The fresh cool water is drawn direct from the underground source of supply. It is obvious that the source of supply of water should be one with a good flow, and a large reserve capacity. The pump and motor used should be of sufficient capacity to maintain a good flow of water at all points in the reticulation system.

Power for Pumps

Windmills, electric motors, oil fuel motors, and waterwheels are the more common sources of power supply. It is only in certain "windy" districts that full reliance can be placed on a windmill to ensure a constant supply of power to operate a pump. It often happens that just when water is most required there is no wind to drive the mill. For the dairy farm the windmill is not a sufficiently reliable source

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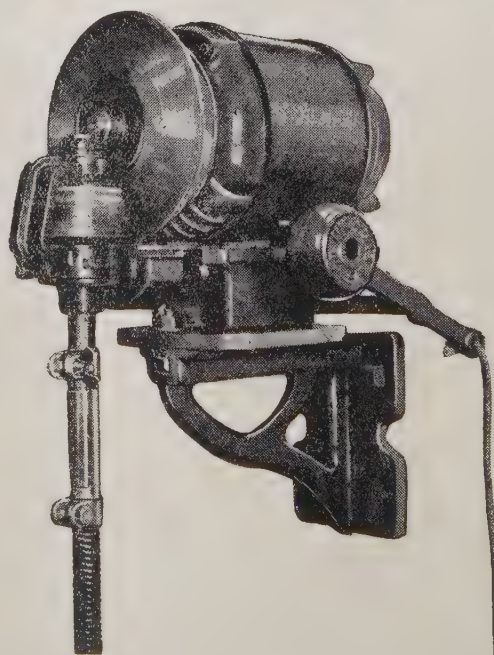
Each stand has a separate motor which drives the gear by means of a friction cone. THE FRICTION SPINDLE IS FITTED WITH BALL BEARINGS ABOVE AND BELOW THE CONE.

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The windmill is being replaced on many farms by electric or petrol motors.

of power supply, and the use of electric or oil fuel motors is more generally relied upon.

Electric power is now available in most farming districts of the Dominion and electric pumping has become very popular. The tendency with electric power is to have separate motors for operating the milking plant, the separator, and the water pump. Where an electric motor is used for pumping purposes float switches can be installed in the tanks, and these are set to cut out the motor when the tanks are full, or to bring the motor into operation when the water level falls to a certain mark.

Oil fuel motors are used in districts where electric power is not available. It is usual to install a motor of sufficient power to operate the milking plant, separator, skim milk pump, and the water pump at the one time. The main drawback to an oil fuel motor is that sufficient water is not pumped during milking hours, and in hot weather the engine is required to run with a light load for pumping purposes only. Running a large engine at light load for considerable periods tends to make this type of pumping expensive, and economy may sometimes be effected if an electric light plant can also be driven and the engine used to charge the storage battery. Where possible the power used for operating pumping machinery should be properly proportioned to the work required. A pump of adequate size and plenty of storage should be provided wherever possible in case of breakdown and to save continuous pumping

Care of Machinery

All pumping machinery should be carefully inspected and oiled or greased at regular intervals. Care in attending to the machinery at the right time will be amply repaid. In time reciprocating pumps are certain to wear somewhat, and the bearing surfaces should be kept well oiled. The leather

or other type of pump packings should also be examined, and replaced from time to time. As far as possible the greatest care should be taken to see that gritty material is excluded from the water system in order to prevent wear in pumping machinery. Power units used for pumping purposes, such as petrol motors or electric motors, should, of course, receive appropriate attention at regular intervals.

Flow in Pipes

In all pumping operations two factors must be considered: the actual raising of the water and the effort to force it through the pipe. This latter, though not so obvious, is frequently the more important.

Suppose water is being forced by a pump at a rate of 3 gallons per minute through a $\frac{1}{2}$ in. pipe 100ft. long, the outlet being 50ft. higher than the intake. Power will be required: (a) To raise the water through a vertical height of 50ft.; (b) to overcome the internal friction of the pipe—the **friction head**. In this example the friction head is 40ft., and this, as regards the power required, is equivalent to increasing the vertical lift by 40ft. for each 100ft. length of pipe, and giving a **total head** of 90ft.

FRICITION HEAD IN FEET PER 100ft.
LENGTH OF PIPE:

Gallons per Minute.	1"	Size of Pipe. 1 1/2"	2"	3"
1 1/2	3			
1	7	0.3		
2	18	0.7		
3	40	1.3		
4	70	2.5		
5	110	3.8	0.5	0.2
7	200	7.0		
10	430	13.0	2.0	0.5
20	—	45.0	7.0	1.7
				0.2

It will be noticed that the friction head increases very rapidly for relatively small increases in the quantity of water pumped, but diminishes considerably with slight increases in the size of pipe used. For this reason it is sometimes false economy to use an unduly small pipe between the pump and reservoir, as this may involve a considerable increase in pumping costs. Small pipes also have a short life owing to corrosion and silting. It will be found that as the pipes corrode the friction head is greatly increased, and higher pumping costs result. The fitting of bends also increases the friction head, each bend being equivalent in this respect to increasing the length of the pipe by about 15 diameters. Fitting an elbow is equivalent to a pipe length increase of about 30 diameters.

Size of Power Unit

The size of the power unit required can be quite simply calculated by multiplying the total head by the number of gallons to be pumped per minute, and dividing this by 2500.

Example: Water is to be pumped at a rate of three gallons per minute through a $\frac{1}{2}$ in. pipe 500ft. long, the outlet being 50ft. higher than the intake in the well.

$$\begin{array}{rcl} \text{Vertical height} & \dots\dots\dots & 50\text{ft.} \\ \text{Friction head (see table)} & 40 \times 500 = & 200\text{ft.} \\ \hline & 100 & \\ & \text{Total head} = & 250\text{ft.} \\ \hline \text{H.P. needed} = & 250 \times 3 = & 0.3 \text{ h.p. approx.} \\ & 2500 & \end{array}$$

It will be noted that the power required to force the water through the pipe is actually four times that re-

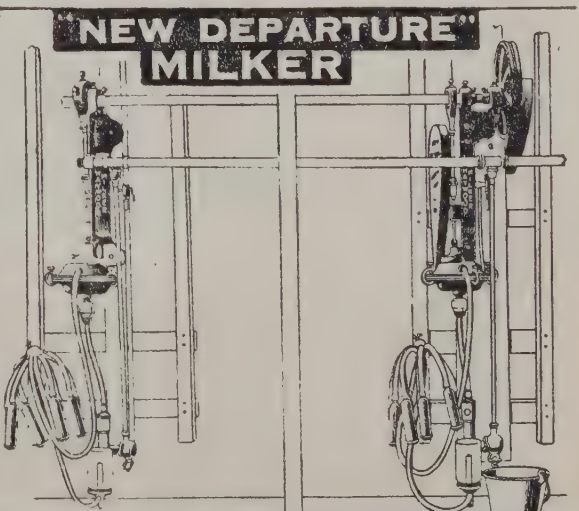
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quired to raise it. Using a 1in. pipe the h.p. required would be:—

Vertical height	50ft.
Friction head	1.3 x 500 = 6.5ft
	100
	Total head = 56.5ft.
H.P. needed = $56.5 \times 3 =$	1 approx.
	2500 15

This means that the power required for pumping, using 1in. pipe, is only about a fifth of that needed when a ½in. pipe is employed.

Installation of Supply

The actual work involved in installing a farm water supply is by no means difficult, and is well within the capacity of any farmer who is moderately skilful in the use of tools, while the equipment necessary is not expensive and will quickly repay its cost. This equipment comprises a pipe vice, two pipe wrenches, a pipe cutter, and a die for thread cutting; these, together with the usual tools to be found on any farm, will suffice for any ordinary job. The pipes are bought in variable lengths, and are already fitted with union screws and sockets. A wide range of fittings is available, and the

work is largely a matter of screwing the sections together and fitting appropriate bends, reducing sockets, stop-cocks, etc., where required.

Site for Reservoir

Since comparatively few farms are so fortunate as to possess a natural supply of water which can be conveyed by gravity, some form of elevated reservoir must as a rule be installed. The reservoir should stand high enough to ensure a good flow of water to every field, but should not be unduly high, as this merely wastes power and results in greater trouble with leakages. Any natural eminence conveniently situated may be utilised, or if this is not available and the farm is fairly level, a tank may be raised on trestles sufficiently high to give the required fall.

Where an elevated tank is installed it is sometimes found that the water becomes too warm for efficient cooling. This difficulty can be overcome by passing some of the water to the tank through the cooler. In addition to being highly efficient this practice results in less waste of water.

It should be noted that water can be siphoned from the reservoir over any natural obstacle, provided the outlet is low enough to ensure sufficient fall. In the event of the tank being allowed to empty, however, the supply pipe must be filled with water by means of a force pump. Until this has been done the water will not flow.

Capacity of Reservoir

While the size of the reservoir required must depend on a number of factors, it should be of sufficient capacity to hold at least two days' supply for all stock and domestic requirements. This figure should be regarded as a minimum, and so small a reserve would be justified only by some alternative source of supply, which could be used in the event of emergency.

The type of power unit, the source of supply, and the facilities for repairs must also be taken into consideration. Where windmills are used, or where the supply is largely dependent on rainfall, generous provision should be made for an adequate reserve. In the event of any breakdown in the water supply during dry summer weather the loss sustained by a dairy herd in full

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milk may be a serious matter, and to this must be added the trouble and inconvenience caused by the lack of an adequate domestic supply.

Site of Pump

While the site of the pump must depend largely on natural conditions, a central position will usually be found most convenient. On a dairy farm it is sometimes an advantage to have the pump located at the cowshed, as it can then be driven by the power unit used for the milking plant. This is of little importance where electric power is available, as a small motor can then be cheaply and efficiently used. Where a whole farm has to be watered from a pipeline the cost of reticulation is not usually materially affected by the position of the pump.

Water Troughs

Provision should be made for drinking facilities in every paddock and for a convenient and adequate supply of water to the cowshed and piggery. Though wooden or iron troughs are frequently used, the most satisfactory drinking trough for cows is made of concrete (see Bulletin No. 184, "Concrete on the Farm").

While the most suitable size of trough must depend on the number of cows to be supplied, the trough should be large enough to allow of the cows drinking freely according to their requirements, without causing undue congestion. The trough should hold sufficient water to allow four gallons for each cow in the paddock, and if the flow of water is low, this quantity may with advantage be increased.

Layout of Pipelines

The usual farm water system comprises two main lines: a delivery pipe connecting the pump and reservoir, and a supply line between the reservoir and the troughs.

Since the water must be pumped through the delivery pipe, the bore should be fairly large. This is important, as it must be remembered that increasing the size of the pipe reduces the friction head, and thereby reduces the cost of pumping. In practice the diameter should be not less than 1 in., and may with advantage be increased if the pump is of large capacity. To avoid duplication lead-offs to troughs may be taken from the delivery pipe, provided that it enters at, or is continued to, the bottom of the reservoir.

The field supply line is led from the reservoir or from the delivery pipe to troughs in the various fields. Since the water merely runs through this pipe by gravity, its size does not affect operating costs. It should, however, be sufficiently large, having regard to the fall, to provide an adequate supply

at all fields. The following table shows the approximate quantity of water which will be delivered by various-sized pipelines 1000ft. long.

DISCHARGE IN GALLONS PER MINUTE.

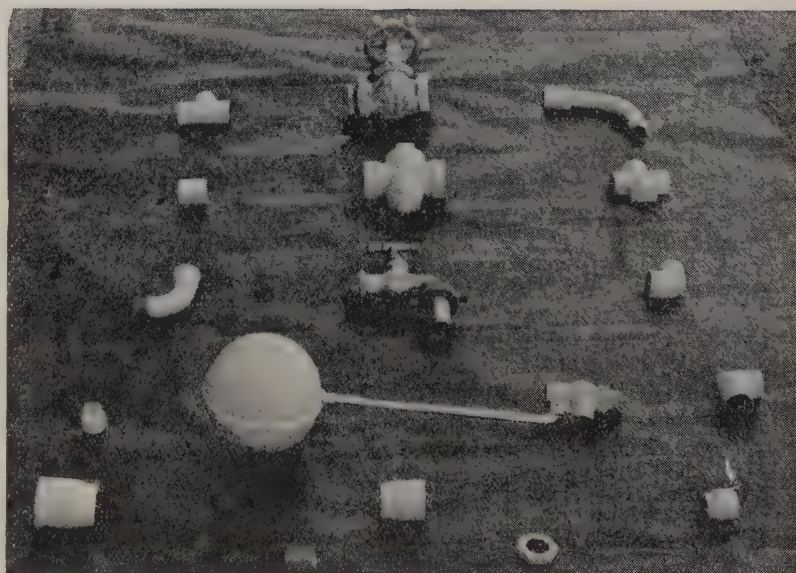
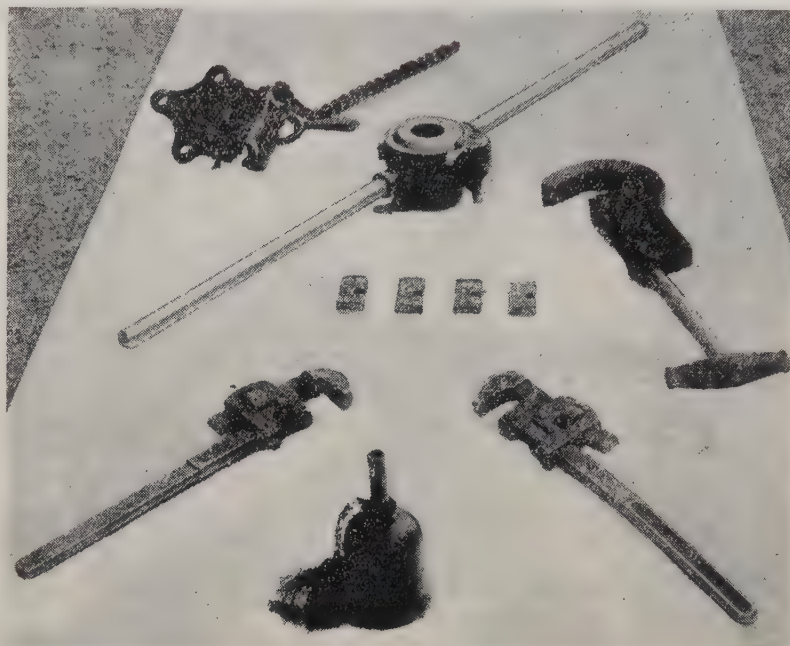
Head of fall in feet.	Size of Pipe.				
	1"	1 1/2"	2"	3"	4"
20	.6	1.7	3.5	6.4	9.8
30	.75	2.1	4.1	8.6	12.4
50	1.0	2.9	6.0	11.3	16.5
100	1.5	3.9	9.0	15.8	24.4
200	2.4	6.0	12.8	24.0	35.7

The domestic supply line may be led off either from the reservoir or from the delivery pipe, provided the latter

does not supply an undue number of troughs. It may on occasion be taken from the field supply line, but if this is done, provision should be made for an additional cistern at the house to ensure a constant supply. This is of particular importance where a hot-water system is installed.

Laying Pipes

When the locations of the pump and reservoir have been decided and convenient positions for the various troughs have been fixed the line from



Tools (upper) and fittings (lower) required in pipe-laying operations.

the pipes can then be marked out. This should be very carefully planned to avoid any unnecessary duplication and to reduce the length of piping to the minimum required for efficient working.

The work of preparing the trench can be greatly expedited by the use of a plough, leaving only the finishing to be done by spade. The depth should be sufficient to protect the pipes from frost, and, where the ground is cultivated, from implements. A depth of 12in. to 18in. is sufficient for most purposes, though it will be found that the water will be cooler in hot summer weather if the trench is deeper.

The work of laying pipes is comparatively simple. The lengths of piping are laid along the trench and are then coupled together section by section. Where a lead-off is to be taken the pipe is cut to give the required length; a thread is then cut and a right-angle bend or "T" piece fitted as required.

Cutting Pipes

Galvanised pipes are usually cut with the ordinary wheel cutter, although a hacksaw will do equally well. When cutting grip the pipe in the vice and place the cutters where required. The wheels should then be squeezed into the pipe little by little as the tool is revolved around the pipe until the piece falls off. In applying three-

wheel cutters care must be taken to hold the tool square with the pipe; if this is not done, the wheels will cut several grooves instead of one, and if the wheels slip from one groove to another, their edges are liable to break. Three-wheel cutters are particularly convenient for cutting pipes in awkward situations where it is impossible to swing the tool entirely around the pipe.

The cut ends should be examined to see whether any cracks or splits have been started by the cutting operations. Oil should be freely used in cutting piping, and the cutters should be kept sharp. If the cutters are blunt they will not wedge apart the metal forming the pipe, but will force a large part inwards, thereby reducing the bore of the pipe at this point by forming a large burr. Even if the wheels are kept perfectly sharp, a burr will be formed, but it will be much smaller than if the wheels were dull. On all work the burr should be removed.

Cutting Threads

In order to cut clean, smooth threads the cutters of the dies that form the threads must be sharp and correctly shaped. These cutters are often called "chasers." Modern dies are made with the chasers on the angle, and the threads are left smooth and perfect. The space in front of the chaser, in the stock or holder, is the **chip** space required for the discharge of the chips, and to provide means for lubricating the chasers. A lack of chip space will cause the chips to choke the dies and tear the threads.

The number of chasers required in a die to get good results in threading at one cut varies with the size of pipe. Thus for 1½in. pipe and smaller four chasers and for 1½in. to 4in. six chasers are required. Solid dies are commonly used for threading small pipes. The dies are slipped over the cut end of the pipe. There being no set screws on the guides of the small stocks, the thread is started by pressing the dies tightly against the end of the pipe

while revolving the stock slowly. After the dies have caught a firm hold of the pipe the pressure against the end is relieved, the pipe end is heavily oiled where the thread is to be cut, and the stock is revolved steadily until the dies have travelled far enough to make the required length of perfect thread on the pipe. When the thread is being cut it should be periodically oiled and the dies thus kept cool. If this is neglected, the dies will soon be ruined, and will cut ragged threads. After the thread has been cut the chips should be blown out of the dies and then the dies run off the pipe.

Screwing on Fittings

In order to make sure of having a watertight joint it is customary to paint the threads and bind on a few strands of hemp, and also to paint in the fitting with red lead before entering the male thread. Care must be taken not to overload the female thread with red lead, as it may be pushed inside the pipe and so partially block the waterway.

The fittings should not be screwed up too tightly or they may split. In screwing on valves or other brass fittings the wrench should always be applied to the hexagon shoulder provided for the purpose; this will prevent distortion of the brass fitting. A Stillson wrench or pipe tongs should never be used on brass valves or fittings.

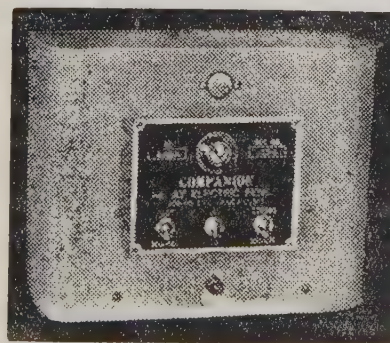
Automatic ball-cocks should be fitted at the various troughs, and the floats should be of copper, as any other metal quickly corrodes and proves unsatisfactory in service. If the delivery pipe supplies a number of troughs, a non-return valve should be fitted at the pump end and a stop-cock where the pipe enters the reservoir. If the delivery pipe does not make actual contact with the water in the reservoir, a non-return valve or stop-cock is not necessary. A stop-cock should also be fitted to the supply pipe at the reservoir. This is frequently useful when making repairs or alterations to the line.

The filling in of any section of the trench should be delayed until the water has been turned on at full pressure. This allows of any leaks being readily detected and avoids the necessity of reopening the trench.

Milking Machine

cleaning and maintenance are treated in Bulletin 118, available free from offices of the Department of Agriculture. Hints on prolonging the life of rubberware will be found particularly useful in these days of shortage of materials.

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Blackberry Eradication

— By —

C. WALKER,
Instructor in Agriculture, Thames.

I DREW attention in the August, 1938, issue of the "Journal of Agriculture" to a method of blackberry eradication which had been successfully employed by Mr. M. G. Cruickshank on some of the shallow peat country in the Te Puke district. Quite recently, some eight years after the initial work was performed, I had an opportunity of checking up on the method employed so as to discover whether the success previously claimed had been of a truly permanent nature.

From an examination of the pastures it is quite evident that the method of control is quite as efficient today as it was claimed to be six years ago. Furthermore, Mr. Cruickshank assured me that in none of the intervening years has blackberry shown any tendency to re-establish itself on this land.

As it is possible that the eradication of blackberry is a problem confronting many who are not familiar with the procedure published six years ago, the

following facts may be of considerable interest.

Mr. Cruickshank had an area of about 80 acres of blackberry on a piece of shallow peat country that he had acquired. Over more of the area the growth was extremely dense, and rose to a height of 6ft. or more.

Burnt and Grazed

In the late spring of 1936 he rolled down a portion of this area, using a



Regrowth of blackberry where preparation was hurriedly performed without employing sheep for crushing.

tractor for the purpose; and he found that, in parts, the power of a tractor was fully extended in performing the operation. He followed this by discing the blackberry, again using the tractor. His idea in so doing was to cut up the blackberry stems into short lengths so that they would dry out and subsequently carry a fire. Choosing suitable weather, he burnt this area in early December, and obtained a fairly successful burn in which practically all the blackberry was destroyed.

As was to be expected, this was followed a few weeks later by a fairly strong regrowth of shoots from the crowns of blackberry plants. To control these he crowded well-conditioned dry ewes on to the area at the rate of ten head per acre, and kept them there, with a few short breaks on to pasture, until mid-March. The sheep were certainly punished to some extent, but, as the objective was ruthlessly to destroy blackberry, the loss of condition in the sheep was of secondary importance. As a consequence no plants could make any progress, so that by March the sheep had nothing to eat on the area.

Pasture Established

He then followed this punishing grazing by a good discing to provide a seed-bed, in which he sowed the following mixture with three cwt. superphosphate per acre late in March:—

	lb.
Certified perennial ryegrass ..	30
Certified white clover ..	2
Paspalum	8
Total per acre	40

An excellent pasture established immediately and has persisted ever since, while the regrowth from blackberry has been negligible.

In striking contrast with this experience was another attempt made by this farmer. Commencing in the late



Country in foreground developed from previous dense blackberry growth. Note heavy blackberry over the fence.

summer and early autumn of 1937, he put another piece of the same country through all the above-mentioned procedures, except that he did not prevent the blackberry regrowth with sheep. Time did not permit of this, so he simply re-discd the area after burning and sowed it down in the same mixture. While the pasture established quite well, it was soon overrun with blackberry regrowth, which entailed a great deal of attention for years following the initial work.

Grazing Essential

From the evidence supplied on this block it is clear that blackberry can be beaten, provided one is prepared to commence work early enough to enable sheep to be used in the manner described. Time, in such work, is an important factor; and when this can be combined with the constant nibbling of hungry sheep it is very apparent that such a persistent weed as blackberry can be beaten.

There is no reason, either, why a similar method with suitable modifications should not be employed against such weeds as gorse. Sheep will eat the young growth, so that, if the initial heavy cover is removed and burnt, close stocking on similar lines should produce satisfactory results.

SPACING FENCING POSTS

This table is a handy ready reckoner of the posts required at specified spacings for a length of fencing:—

Distance apart.	No. of posts Per chain. Per mile.	
6 ft.	11	880
8 ft.	8.25	660
8 ft. 3 in.	8	640
9 ft.	7.33	587
10 ft.	6.6	528
12 ft.	5.5	440
14 ft.	4.71	377
15 ft.	4.4	352
16 ft.	4.125	330
16 ft. 6 in.	4.0	320
18 ft.	3.67	293
20 ft.	3.3	264
22 ft.	3.0	240

Staples—
Post: 1½ in. x 7 or 1½ in. x 8, 42 staples weigh 1 lb.

Batten: 1 in. x 12, 200 staples weigh 1 lb.

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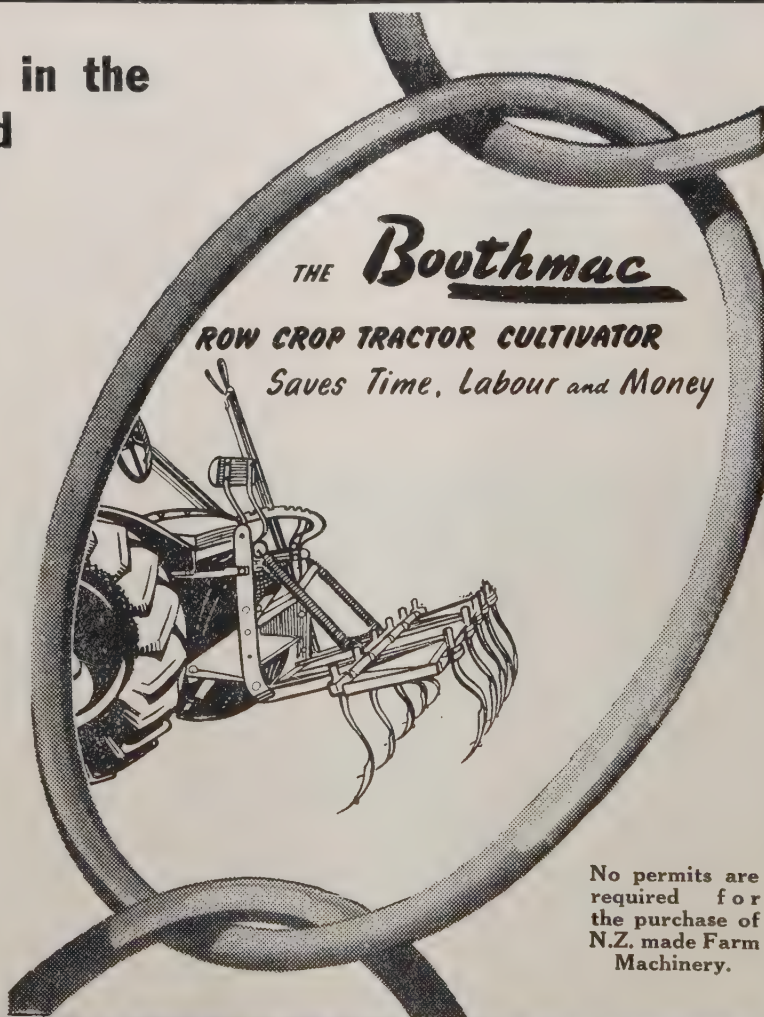
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FARMING A SMALL HOLDING

By
C. WALKER,
*Instructor in Agriculture,
Thames.*



Quite recently I had an opportunity of discussing with him the farming operations of a Thames small-holder who derives all his income from his earnings on approximately 15 acres of undulating country. Prior to the war in 1914-18 this man was employed in a local commercial business having no direct contacts with farming operations, so that any success he may have attained could not be attributed to a prior knowledge of his present occupation.



A general view of the holding.

AS was the case with many returned men of the last war, a number of years of outdoor service with the army left him with no desire to return permanently to his indoor occupation. However, as he was sufficiently incapacitated to make ordinary farming too difficult, he decided to attempt to make a living from the small holding upon which he is now residing.

When he first acquired it there was much improvement to be done. Manuka scrub and blackberry had to be contended with, subdivisive fencing had to be erected, and buildings had to be gradually acquired.

As a result of well-applied labour, this place today is all in very fair pasture with weeds well under control. Fences have been erected to give eight fields varying from four acres to half an acre in area, so that good control of pastures can be exercised. In addition, such buildings as a hay shed, a cowshed, dairy and pig pens, and two glasshouses have been built.

During the same period quite a good small herd of 10 grade Jersey cows has been built up, together with young stock for replacement, pigs, and poultry.

As a sideline to dairying this man has planted a variety of fruit trees—principally early apricots and early plums—and, although most of these are now declining in yield, they still produce enough to make their returns felt in the farm income.

Of the two glasshouses one measuring 60ft. by 23ft. is devoted each year to the production of early tomatoes. The other measuring 16ft. by 14ft. is used for the propagation of plants and also for the production of early cucumbers. From both of these houses the whole season's produce is marketed between late November and New Year when the highest prices are ruling.

Farm Production

To give some idea of what a small holding will produce the following figures, representing the average of several normal seasons, are quoted:—

	£	s.	d.
Plums and apricots—150 cases at 12/- per case ..	90	0	0
Tomatoes—100 cases at £1 per case	100	0	0
Cucumbers—20 cases at 10s. per case	10	0	0
Dairy produce—2,256lb.	162	3	0
Pigs	25	0	0
	<u>£387</u>	<u>3</u>	<u>0</u>

It should be noted that in the past year or two returns per case have been nearer £2 to £2 10s. for all the above fruit, but these high prices have not been taken into account in striking an average.



Some of the herd beneath apricot trees.

Farm Costs

In the production of any commodity there are certain expenses to be met. Unfortunately, perhaps, these are proportionately higher on a small holding than they would be on a larger farm. For instance, with such a small area fully stocked up it becomes almost impossible to save any quantity of hay for winter feed, or to do any cropping for the same purpose. Consequently most of the winter feed has to be bought.

Similarly, the outlay on equipment is not proportionately reduced just because a holding is small. On the contrary, it is generally much higher when estimated on a per acre basis.

Taking an average, then, of expenditure in any one year, the position on this farmlet was much as follows:—

	£	s.	d.
Annual rates	13	14	4
Interest payment	27	3	4
Insurance	4	4	9
Orchard tax	5	6	
Fertiliser (before rationing) 2½ tons at £4	10	0	0
Lime, 3 tons at £1 5s.	3	15	0
Spray materials	2	10	0
Glasshouse maintenance	10	0	0
Fence maintenance	6	0	0
Hay	26	0	0
Bran and pollard	4	0	0
Petrol and truck maintenance	20	0	0
Sundry expenses—commission, repairs, etc.	50	0	0
	£177	12	11

No item for herd replacement is shown, as this is balanced by the sales of old cows. The practice on this holding is to rear a heifer or two each year, and, as these come into profit, the older cows are disposed of.

A comparison of expenditure and returns on this farmlet will show that the owner received a net return of about £4 per week, together with free house rent, ample fruit and milk for his requirements, and that freedom of occupation that he desired.

Possible Supplements

There are certain other directions in which he could possibly augment his earnings quite considerably. For instance, after New Year his glass-houses are empty. These could be made to bring in added income if they were planted in French beans to bear in April or May when the price per lb. is over 1s.

At the present time his interest in poultry does not extend much beyond the provision of sufficient eggs for his household. However, with the

warm situation that he occupies egg production could be made much more profitable.

Small fruits, too, would offer another avenue through which his income could be appreciably increased. Strawberries bear particularly well in his locality. Likewise gooseberries and guavas could be exploited to a greater extent. Furthermore, with many of his fruit trees ageing, it would be advisable to plant for replacement and even for extension. Early fruit still commands a high price, and, with proper care, good fruit can still be produced.

Dairying appears to be exploited to its fullest extent with 10 milking cows and young stock on this holding; obviously, then, any improvement in farm income must come from another source.

However, even with no appreciable improvement, the returns as shown indicate that there is a reasonable living to be made—a living that would be equal to, or better than, a £7 per week wage in a city where high rents rule and outlays for milk, eggs and firewood have to be made.

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FARMING IN NEW ZEALAND

Development of Farming

THE development of New Zealand farming may be divided into several rather distinct historic periods, which overlapped to a certain extent, but each of which showed certain prominent characteristics. Prior to European settlement the Maoris grew kumaras and other crops for food, and the early settlers with no overseas markets were forced into subsistence farming. Great progress was made between 1853-1882 with the development of the pastoral industry, and this was followed by the introduction of refrigeration in the eighties and the development of the meat and dairy industries, progress in which has been most marked since 1900.

MAORI AGRICULTURE.

THE Maori did little to modify the native vegetation of New Zealand. Settlement was concentrated mainly on the coastal areas, where there was access to the forest and sea as a source of food supplies. The greater part of the Maori population lived in the North Island. There were only a small number of Natives in the South Island, where it seems the colder climate was not favourable to settlement; also the absence of timber in the tussock country made difficult the building of pas (Maori villages). In the North Island the Maori burnt the bush and cleared the ground for the crops which he had originally brought to New Zealand.

When the Maoris reached New Zealand from their former homeland in the warmer islands of the Pacific they settled in a country of colder climate. Plants which had formerly flourished in a tropical climate at times failed to grow when they were introduced into this country. The few plants the Maori did succeed in establishing were limited mainly to the warmer districts of the North Island. Although the Maori lived chiefly by the planting of crops, cultivation was only on a small scale. The food supply was supplemented by berries and roots from the forest and fish from the sea and rivers. In southern areas where cultivation of the introduced food crops was not possible the Natives were not without such produce, as they exchanged goods with the more

fortunate inhabitants of the North Island. On the open tussock plains in the south there was an abundance of wild life and the Natives in the North Island often made journeys to the far south to obtain supplies of

By

MARY AITKEN,
Fields Division, Christchurch.

mutton birds and to the interior for several species of wild ducks.

In the cultivation of crops the Maori was handicapped by inadequate tools for digging. The tool commonly used was a hoe or digging stick (ko). It had a long handle about 8 to 10ft. long and blade 3in. in width. It was not used for turning over the soil, but was employed only for loosening it. After the surface had been opened up roughly flat wooden spades were then used for digging. The Maori agriculturist had a wide knowledge of soils and recognised several distinct soil types, each type being distinguished by a separate name.

The Maoris grew no cereal crops, but cultivated mainly root crops. The four most important root crops were the kumara, yam, taro, and the gourd (or hue). The kumara was the staple crop and much care and attention was

devoted to its cultivation. Early visitors to these shores remarked on the neat appearance of the kumara fields. Individual plants were planted on small mounds about 20in. apart in straight rows. Once crops were planted they needed little attention, as there were few weeds in primitive New Zealand. Fences were often erected around the kumara fields to protect them from the strong winds. Young plants were also screened from the sun and wind by manuka branches. Irrigation of crops was not practised, but on heavy land drainage was necessary. Before the coming of the European the Maori had drained large swamp areas for the growing of crops. On cold soils a layer of gravel and sand was often spread over the surface of the ground to attract heat to the plants. The Maori also mixed sand with heavy soils to improve them for kumara growing. After harvesting the crop was stored in shallow underground pits for future use.

The yam, taro, and gourd were restricted to northern districts. The yam was grown only in North Auckland and favourable East Coast situations as far south as Napier. The seed tubers of both the yam and taro were placed in holes in the ground and covered over. The gourd (or hue) was cultivated in trenches; it extended further southwards than the above two plants. When young it was used as a vegetable and when fully developed the gourds were skilfully fitted with wooden necks and used for holding water.

The Maori was not an extensive agriculturist. Firstly he was handicapped by the climate, which restricted the range of his cultivated crops. Secondly the Maori was at a disadvantage owing to a lack of suitable tools. The greater numbers of the Maori population were confined to the warmer coastal districts of the North Island where the climate was suitable

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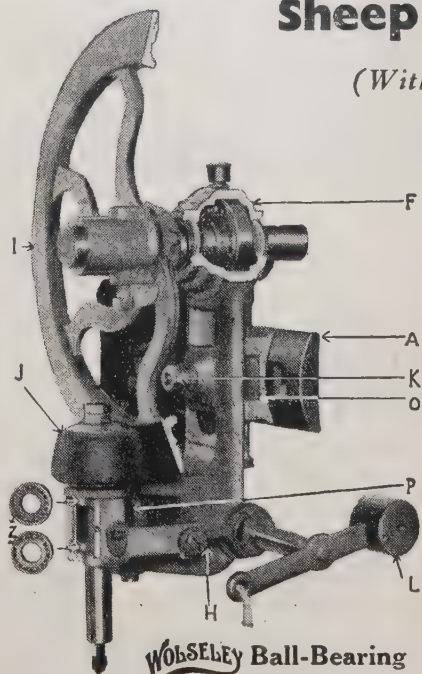
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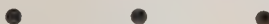
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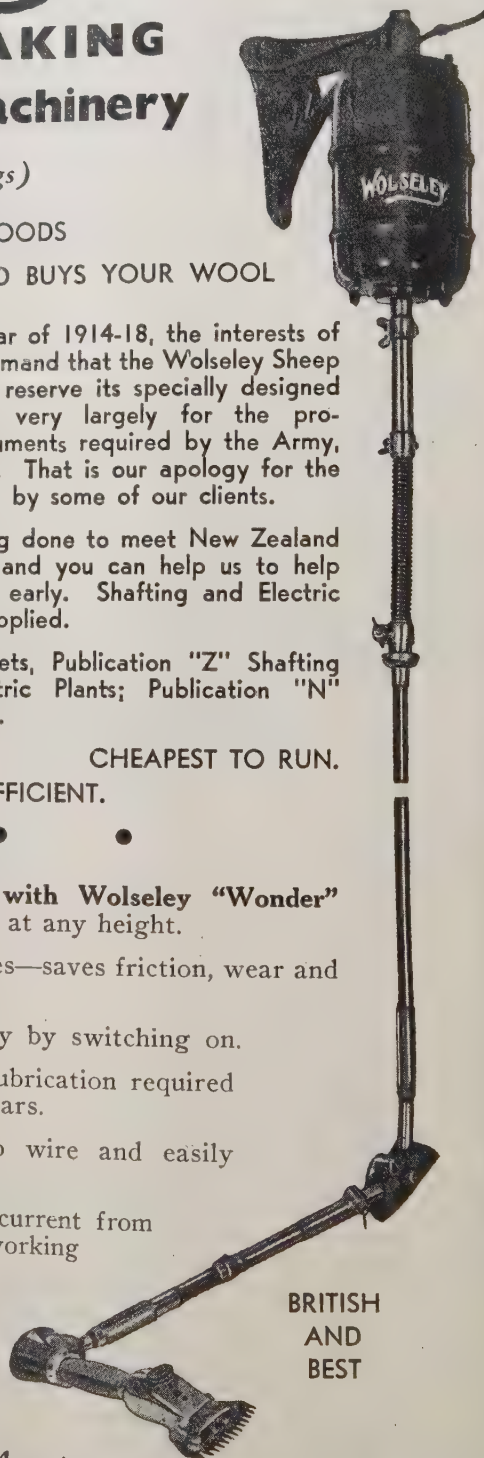
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to the introduced food crops. Thus on the arrival of the first settlers there were no extensive areas of cleared land.

1840-53

EXPERIMENTAL AND SUBSISTENCE AGRICULTURE.

In the early part of the 19th century New Zealand coasts were frequented by whalers and traders, who came ashore for supplies of timber and flax. On all the coasts of New Zealand there were isolated settlements of whalers, who lived ashore during the summer months and cultivated crops such as potatoes and wheat. These isolated groups often had numbers of pigs, poultry, and goats. It was from contacts with these early visitors that the Maoris acquired new crops, notably the potato.

The Maoris were eager to obtain these additional food crops, and showed great skill in cultivating them. In some cases they abandoned their former crops of taro and yams, as they recognised the value of the potato. In 1835 the scientist Darwin, who visited the Bay of Islands, says, "The introduction of the potato has been of the most essential benefit to the island; it is now much more used than any native vegetables." Individual areas of 50 to 100 acres under this crop were a common sight around the Maori villages. Large areas were also planted in crops such as wheat and maize. Visiting ships were able to take on fresh supplies of food grown in the Maori fields or gardens of the missionaries. These early years of Maori-European agriculture were prosperous ones, many reports remarking on the well-kept appearance of the cultivated areas. It was the missionaries who were responsible for a more permanent form of settlement. They instructed the Maori in new methods of agriculture and provided him with better tools. The missionaries also carried settlement into the interior districts.

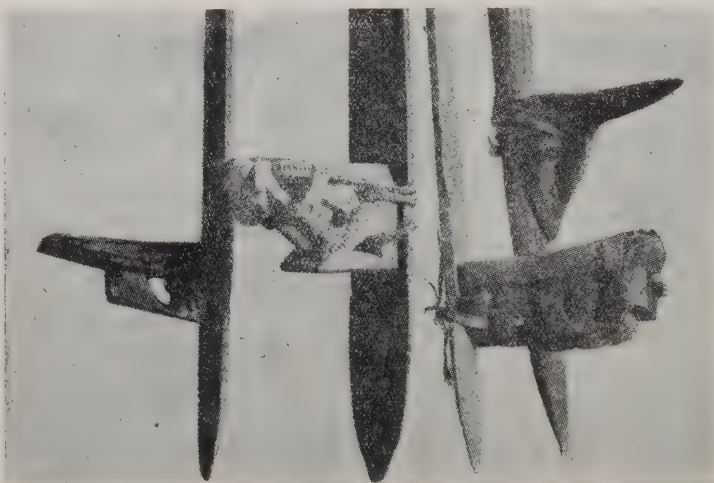
After New Zealand had been proclaimed a Crown Colony the settlers who arrived were dependent on what they could grow off the soil. In the early references to agriculture in New Zealand there are numerous remarks dealing with the fertility of the soil and the extremely favourable climate. Many plants and animals had to be imported, as the land itself provided few food crops. New Zealand farming early had contact with Australia, especially New South Wales. In 1844 some 400 merino ewes were imported from New South Wales for grazing in the Wairarapa district. By 1846 there were 36,500 sheep and 5,500 cattle in the country. These were mainly on the plains of the South Island, where the open nature of the country early attracted settlement. At first farming was handicapped by the scarcity of breaking-in implements and the ground was just chipped with the hoe. Even though methods were primitive, yields on the virgin soil were high.

Owing to difficulties such as the above, settlement proceeded but slowly, the colonist being mostly occupied with stocking his land and in acquiring new crops. The first organised settlements were made under the Wakefield system of colonisation. This system demanded a fixed price for the sale of land. The price was such that it would only pay settlers to take up land and produce for direct con-



The Maori as a digger. Using the *ko* or digging stick.

[Photo by A. Hamilton, 1898.]



Method of attaching footrest to shaft of digging tool.



Native woman using a *timo* or grubber.

[J. McDonald, photo.]

THE DAIRY INDUSTRY



In the early days of dairying roads were bad and the area covered by a factory was limited by the distance it was possible to cart whole milk. Accordingly, for butter manufacture numerous skimming stations (or creameries) were erected, to which farmers carted whole milk and took away the separated milk for feeding pigs and calves.



Home separation was then introduced and progressive improvements in road transport allowed of the development of large modern factories. The first four illustrations show an early creamery, a modern butter factory, the sampling of cream on the receiving stage, and the completion of a churn of butter.



On the farm the progress has been quite as marked as in the factory. Pastures, supplementary feeding, and dairy stock have been improved, and with the introduction of machine milking, the walk-through shed, and electric power it has been possible to develop dairying with the minimum of labour. One man can milk 25 to 30 cows, a man and a boy 50 to 60, two men 80, and three men 100 cows. The last two illustrations show a modern internal-race shed and separator room.

sumption; it was thus hoped that the country would develop on arable farming lines. At that time there were many who visualised New Zealand as a wheat-exporting country. New Zealand, however, was far distant from markets for such products.

It soon became apparent that the colonists, in order to be self-sufficient, were forced to follow a mixed type of farming, producing for a restricted market. There was, however, a considerable interchange of goods between New South Wales and New Zealand, New Zealand wool being favourably received in that State. An increasing trade grew up, and many Australians came to this country to take up land. In the South Island thousands of square miles of tussock grassland outside the agricultural settlements were eminently suited to pastoral farming and the production of wool, which was an exportable commodity. At first a difficulty of the settlers was to obtain land at a lower price than that prevailing under the Wakefield system. This was accomplished by the Land Act of 1853, which made large areas available for settlement.

The end of this first period of settlement saw the establishment of disconnected centres of population on the coastal area. In inland areas, mainly in the South Island, were large runs separated from one another by river boundaries. These had sod huts for homesteads and a minimum of cultivation, the chief areas of cultivated land being in the original settlements.

1853-82

THE DEVELOPMENT OF PASTORAL AND ARABLE FARMING.

In the early fifties, owing to the gold discoveries in Australia, New Zealand produce found a ready market overseas. From 1857 onwards the discovery of gold in this country brought a constant stream of immigrants to these shores. This inrush provided the increased population which was necessary for the development of the country. The population of Dunedin increased from 5,000 in July, 1862, to 15,000 in October of the same year. On the newly-discovered goldfields towns sprang up at a mushroom rate of growth. Although this new population was largely a migratory one, it did create a demand for agricultural produce. The miners themselves were forced to become cultivators of the soil. They were responsible for carrying many introduced plants into the interior country of the South Island. To-day some of the sites of former mining settlements are marked by groups of fruit trees and lines of poplars. After the mining boom was over many of the miners and those who had been engaged in supplying the mining townships

settled in the country and took up farming.

During this phase of development the country was rapidly building up an export trade. This trade was based chiefly on pastoral products, wool steadily rising in importance from 1853 onwards. Although exports of gold surpassed those of wool in value, it was not a lasting feature. Gold exports rapidly declined in value. The appearance of rabbit skins as an export in the latter part of the period is also of considerable importance. The drop in wool prices in the seventies led to increased wheat production.

TABLE XIII—VALUE OF EXPORTS 1853—1883.

(In thousands of pounds).				
	1853.	1863.	1873.	1883.
	£	£	£	£
Wool	67	830	2,702	3,014
Grain	19	—	136	1,287
Gold	—	2,432	1,987	892
Kauri gum ..	16	27	86	337
Tallow	—	—	67	234
Timber	93	181	44	25
Rabbit skins ..	—	—	—	101
Potatoes	30	—	—	—

It was not only the discovery of gold which brought settlement to the southern provinces. The open nature of the country had early attracted settlement. During the years 1854-58 the more easily accessible areas of the South Island were occupied in a large-scale fashion. Squatters mainly from Australia and the Home Country took up large holdings of 20,000 to 50,000 acres and stocked them with small flocks of merino sheep. These were often sheep of high quality imported from the flocks of England, the Continent of Europe, and the nearer continent of Australia. During the whole of the period under discussion the raising of sheep for their wool was most profitable. There were steady increases in the number of sheep carried.

TABLE XIV—TOTAL NUMBER OF SHEEP IN NEW ZEALAND

1858—1881.		
1858	1,523,000	
1861	2,761,000	
1864	4,937,000	
1867	8,419,000	
1871	9,701,000	
1874	11,705,000	
1878	13,069,000	
1881	12,985,000	

The establishment and stocking of stations, some of them often a considerable distance from the centres of population, took place slowly. Settlers were often stopped from reaching their holdings by difficulties of transportation. As there was a scarcity of timber the early homesteads were often built of stones, sods, or sundried bricks. In the early days before wire fences it was necessary to have a shepherd constantly watching the flocks. At night sheep were often driven into yards enclosed by stone walls. Later fences were made by

building small sod walls and planting them with gorse or hawthorn. Numbers of stock, particularly cattle, were lost in districts where the poisonous tu-tu occurred. In the late sixties scab infestation from Australia accounted for the loss of many sheep, whole flocks often having to be destroyed. Sheep were also attacked by wild dogs which frequented the open tussock country.

The exploitation of the South Island tussock grassland took place rapidly. Many stations were overstocked and the pastures consequently overgrazed. It was soon found that sheep did not eat the coarse tussock grasses, but preferred the finer grasses and herbs which grew in the shelter of the tussock. Stock would also eat the green shoots of the tussock after they had been burnt. This fact led to widespread burning in order to provide feed for the large flocks. Burning often took place at the wrong season of the year. When it was dry fires once started would spread for miles. Repeated burning of the grassland led not only to the disappearance of the tussock but also to the disappearance of the finer species as well. This constant burning and overgrazing soon led to depletion of fertility of native pastures. It is important to realise that this deterioration of native pastures was in many places evident before the rabbit infestation of the seventies. The rabbit invasion put an additional strain on the pastures, in that they had to support millions of rabbits as well as sheep. So rapidly did the number of rabbits increase that rabbit skins soon appeared as one of the chief items of export.

TABLE XV—RABBIT SKINS EXPORTED FROM NEW ZEALAND

1873—1898.		
1873	37,000	
1878	3,951,000	
1883	9,808,000	
1888	11,809,000	
1893	17,041,000	
1898	6,608,000	

In Central Otago the effect of the rabbit was especially disastrous, as the dry climate does not promote an early return of native grasses once they have died out. The introduction of pests, noxious weeds, and such malpractices as burning and overgrazing had created problems of vegetation deterioration and soil erosion especially serious on the high country. Thus the quick and large-scale opening up of the country had brought serious problems in its train.

As mentioned above, during the latter part of this period considerable advancement took place not only in pastoral farming but also in arable farming. These lines of expansion were mainly confined to the South Island. Although gold discoveries took place in the North Island, they

THE PASTORAL INDUSTRY



The pastoral industry first developed on the extensive tussock grasslands of the South Island and later on the surface-sown bush country and ploughed grasslands of both islands.



Extensive pastoral farming developed the mounted shepherd and the use of labour-saving devices and machinery, i.e., machine shearing and efficient shearing sheds, drafting yards, and dips.



The grazier runs cattle as well as sheep in order to manage pasture growth properly. The marketable products of the pastoral industry are wool, lamb, mutton, and beef.

did not result in any extensive farming development. A slow development took place, but the Maori Wars made small isolated settlements unsafe. The bush also impeded progress, although considerable areas had been cleared, chiefly in the far north. Later it was largely Maori labour that was used in clearing the bush and working the newly-made holdings.

In the South Island there was a considerable expansion in wheat growing during the years of low prices for wool. Many of the larger estates concentrated on wheat on a big scale as well as stock. Land was also sown in oats, barley, and turnips. Yields on the virgin soil were high and many believed that the future of the country lay in wheat production. One South Canterbury estate in the early eighties had 4,100 acres in wheat, about 500 in barley, and from 500 to 700 acres in oats. At harvesting time about 300 hands were employed, the work being done by contract. In the late seventies and eighties arable agriculture was made easier by the introduction of first the double and then the three-furrow plough. In 1883 a peak year of production was reached, there being 391,000 acres under wheat. From then on wheat growing declined, as it had to meet competition from other forms of farming, notably greater livestock production.

Another reason not to be overlooked was that the "robber" cultivation which had been practised in the past could not continue. Land which had been cropped year after year went out of production. Wheat has never again been sown in some areas which formerly grew the crop. Towards the end of the century many of the flour mills which had been situated in inland districts closed down. These had been set up in inland towns which had to be almost self-sufficient owing to their distance from the chief centres. Wheat growing tended to become concentrated on the Canterbury Plains, where it fitted into a mixed arable economy. With the coming of roads and railways supplies could be transported more easily to outlying districts.

It was the Public Works scheme of the Government under Vogel which was responsible for the improvements in communications. These were built at great cost to the country and were followed by a period of falling prices. In spite of this it should be pointed out that when refrigeration came and quick transport of stock to the freezer was necessary the country had a railway system which was capable of dealing with increased trade.

The history of these years was characterised by rapid settlement of the land, chiefly in the South Island. It was marked also by increases in the number of livestock and the acreage under cultivation.

TABLE XVI—Land (including Sown Grasses) UNDER CULTIVATION.

	Acres.
1868	502,000
1873	1,417,000
1878	3,524,000
1883	5,651,000

FROM THE ADVENT OF REFRIGERATION, 1882, TO THE PRESENT DAY.

1882-1918

Greater Livestock Production: Dairy-ing.—The advent of refrigeration in 1882 led to widespread changes in New Zealand farming methods. It brought about important changes in production and changes in the composition of exports.

TABLE XVII—VALUE OF EXPORTS 1883—1913.
(In thousands of pounds).

	1883.	1893.	1903.	1913.
	£	£	£	£
Wool	3,014	3,775	4,041	8,078
Frozen meat ..	118	1,085	3,197	4,450
Butter	42	255	1,318	2,062
Cheese	7	100	195	1,770
Tallow	234	184	518	663
Gold	892	916	2,038	1,495
Grain	1,287	583	534	130

The years from 1882 were years of rising prices. Total production was increasing, yet there was a decline in certain export lines. Grain export fell off rapidly. Frozen meat, butter, and cheese exports increased several fold year by year. Wool exports also continued to increase. The actual amounts of the above products exported are as follows:—

TABLE XVIII
AMOUNTS OF FROZEN MEAT, WOOL, BUTTER, AND CHEESE EXPORTED 1883—1918.

	Frozen meat.	Wool.	Butter.	Cheese.
	Cwt.	lb.	Cwt.	Cwt.
	(Thousands).	(Thousands).	(Thousands).	(Thousands).
1883	88	68 149	9	3
1888	552	83 226	30	37
1893	904	109,720	58	46
1898	1,552	149,386	97	69
1903	2,379	155,128	285	75
1908	2,120	162,518	230	281
1913	2,579	186,533	372	612
1918	2,037	108,725	431	420

Before refrigeration New Zealand had been able to produce meat only for local consumption. Sheep had been mainly raised for the export of their wool. There was only a small store sheep market and surplus sheep were consigned to the boiling-down works. In response to the local demand there had been a partial swing-over from the merino to the half-bred, as the latter was a useful meat and wool sheep. Thus the change-over to the dual-purpose sheep was not entirely brought about by refrigeration, though it was certainly accelerated by it. The carcase was now as important as the fleece, and it was to meet this new demand that the Corriedale breed of sheep was evolved. The merino, which in the early days grazed the

native tussock on both mountain and plain, was now virtually restricted to the high country stations of the South Island, where the chief output was wool.

In 1881 (before refrigeration) there were 13,000,000 sheep, and by 1895-96 this number had increased to 20,000,000. Sheep numbers increased rapidly in the North Island, while the South Island numbers remained stationary. These figures take into account the large number of stock that were slaughtered annually for export.

TABLE XIX—NUMBER OF SHEEP.
(In thousands).

	North Island.	South Island.	Totals.
1888	9,541	10,147	19,688
1893	10,286	10,056	20,342
1898	9,865	9,809	19,674
1903	9,435	9,521	18,956
1908	11,632	10,817	22,449
1913	13,145	11,046	24,191
1918	14,758	11,780	26,538

The introduction of refrigeration also meant that dairy produce could be readily sold on the overseas market. Even before 1882 there had been a few dairy factories established. After this date these continued to increase in number. With the introduction of tests for butterfat a further improvement in evenness of product was assured. The number of dairy cows increased as follows:—

TABLE XX—NUMBER OF DAIRY COWS.

1895	257,000
1898	324,000
1903	429,000
1908	541,000
1913	678,000
1918	793,000

These increases in livestock numbers meant an increase in the area under pasture. In 1881 there were 3,500,000 acres under introduced grass (i.e. ploughed and surface-sown). By 1895 this figure had reached 10,000,000 acres.

TABLE XXI—SOWN PASTURES.

	In Sown Grasses; Land Ploughed.	In Sown Grasses; Land not Ploughed.
	Acres.	Acres.
1883	2,275,000	2,480,000
1893	3,611,000	4,651,000
1903	4,578,000	7,250,000
1913	5,000,000	9,215,000

This large increase in surface-sown pasture was mainly in the North Island. The very early settlers had great difficulty in developing farms from forest, but when it was discovered that pastures established remarkably well in the ashes of a forest fire the destruction of North Island forests followed at a very rapid rate. The surface-sown pastures were very productive for the first few years. Difficulties occurred with poor burns and second growth, but it was not until the surface fertility declined and settlement was pushed on to the high elevations and high-rainfall areas that

it was seen that universal success could not be obtained with surface sowing. Large areas have since reverted to second growth and the soil has been depleted by sheet and slip erosion, but surface-sown grassland still remains the most important North Island pastoral area.

Topdressing pastures with phosphatic fertilisers and lime has played an important part in developing intensive grassland farming. The practice commenced on a small scale towards the end of the 19th century: in 1926-27 1,500,000 acres were topdressed and in 1941-42 4,200,000 acres. Topdressing enabled second- and third-class land in the higher-rainfall districts to be converted into high-class dairying and stock-fattening pasture land, and allowed of closer settlement. As the demand for land by small-scale farmers increased, large estates were acquired for subdivision purposes.

1918 to Present Day

INTENSIFICATION OF FARMING METHODS.

1923—1942.

TABLE XXII—VALUE OF EXPORTS
(In thousands of pounds).

	1923.	1933.	1942.
	£	£	£
Wool	10,905	7,422	18,336
Frozen meat ..	9,013	9,846	17,777
Butter	10,689	11,649	16,481
Cheese	6,800	4,766	11,879
Tallow	785	516	1,143
Gold	699	1,282	—

The expansion of the four main exports is shown in table XXIII:—

TABLE XXIII

AMOUNTS OF FROZEN MEAT, WOOL, BUTTER, AND CHEESE EXPORTED 1923—1942.

	Frozen meat.	Wool.	Butter.	Cheese.
	Cwt.	lb.	Cwt.	Cwt.
	(Thousands).	(Thousands).	(Thousands).	(Thousands).
1923 ..	3,044	217,566	1,250	1,441
1928 ..	3,794	226,805	1,450	1,567
1933 ..	5,203	286,307	2,635	1,983
1938 ..	5,373	271,283	2,615	1,611
1942 ..	5,722	304,164	2,344	2,689

Since the Great War there has been a marked trend towards intensification and improvement of farming methods.

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TABLE XXIV—SHEEP AND DAIRY COWS.

SHEEP.		DAIRY COWS.	
(In thousands).		(In thousands).	
	North Island.	South Island.	Totals.
1923 ..	12,893	10,188	23,081
1928 ..	14,574	12,560	27,134
1933 ..	15,047	12,709	27,756
1938 ..	17,803	14,576	32,379
1942 ..	17,971	13,780	31,751

Of late years greater returns have been obtained off smaller areas, and not by an expansion on to new land. This has largely been brought about by the application of scientific knowledge and improved methods. This has meant improvements in livestock and the use of better plant strains. The increasing use of machinery on all types of holdings has also been an important factor. The number of tractors increased from 136 in 1919 to nearly 14,000 in 1942.

TABLE XXV—NUMBER OF TRACTORS.

1918	136
1923	500
1928	3,000
1933	5,000
1938	8,000
1942	14,000

During the same period the number of milking machines increased from 7,500 to 31,500, 86 per cent. of all cows in milk being milked by machine.

TABLE XXVI—NUMBER OF MILKING MACHINES.

1919	7,500
1923	13,500
1928	18,000
1933	24,500
1938	28,000
1942	31,500

Quicker means of transporting stock and farm goods has also been an important factor. The motor truck has

facilitated the taking up of land which is at a considerable distance from the railway.

Within the last 20 years there has been a gradual change in the composition of goods produced. New farming methods have been adopted and new crops established. In recent years seed production in conjunction with other types of farming has been increasingly developed. Irrigation schemes have been put into operation in the drier areas of the South Island. Electricity has been made available to the farmer for use in the home and milking shed. Another line of farming development has been the establishment of orchards and market gardens. These areas are small in relation to the total area cultivated, but yields and returns per acre are high.

After 100 years of European occupation New Zealand is one of the most important exporters of agricultural produce. During the past 30 years improved methods and the application of scientific knowledge to all branches of farming have greatly raised production. It has recently been shown that New Zealand led the world in having the highest agricultural productivity per farm worker.

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—10

CROPS FOR INCREASED PIG PRODUCTION



What Small Farmer is Doing in Waikato

AS the time approaches for farmers to launch their cropping programmes those who are taking an active part in the "bacon for Britain" drive will be giving consideration to the means of carrying their pigs through the winter of 1945. Farmers who have grown crops consistently for pigs are aware of the value of this practice in increasing pig returns, but all who undertake growing pig crops this year will also be taking advantage of the State subsidy of £5 per acre. Small farmers planning to expand pig production will find interest in the experiences and opinions of this Waikato farmer, who, no less than others, has been handicapped by wartime difficulties and, since the 1942-43 season, has had to recommence with new breeding stock.

SITUATED at Te Rapa, six miles north of Hamilton, the farm of Mr. A. A. Holmes, though comprising only 48½ acres of sandy loam, carries at present 30 milking cows, 8 heifers, 7 sows, and 30 fattening pigs, besides a bull, a boar, and a horse. It will be seen at once that pigs are much in evidence, a tribute to the fact that Mr. Holmes is fully aware of the returns to be gained from pigs and is prepared to apply himself energetically to the job of hand feeding and growing crops for wintering. Recent years have been unsettling for pig production on this farm. In fact, when the change to cheese production came about, the difficulty in having whey returned from the factory forced the complete closing down of the pig unit.

Expensive Restocking

With the change back to butter for the 1942-43 season Mr. Holmes, in common with many others returning to pig production, was forced on to the open market to buy breeding sows and stores at inflated prices. Previously

no store pigs had been bought, for Mr. Holmes is firm in the belief that breeding all his own fattening stock is by far the better proposition. Stock purchased to recommence production were two sows close to farrowing, at a total cost of £12 10s, and 20 small stores, costing nearly 30s each. Profits for the season were limited in consequence of the high costs at this stage, but out of the progeny of the first litter a selection of two sows was made to add to the breeding stock in the next season.

The 1943-44 season saw 4 sows in production, served by a pedigree boar purchased from the "Mountley" Stud. Mr. Holmes is most emphatic that to get results from the pigs it is essential

Above: Chou moellier cut from mixed crops on Mr. A. A. Holmes's farm, Te Rapa.

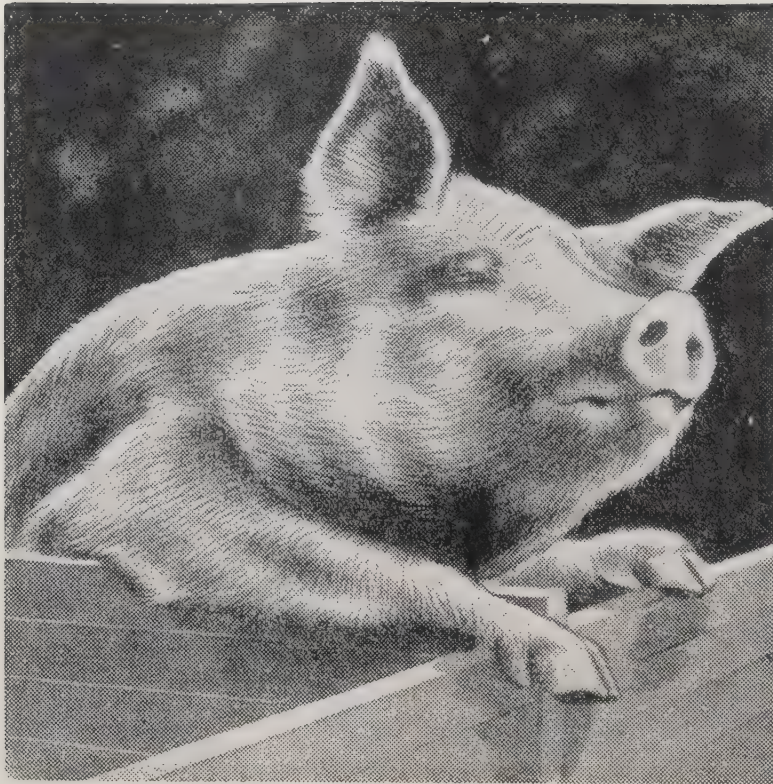
to have a really good boar. He feels that many of the losses in pig production are attributable to the use of scrub boars. In this season the first litter was sold as porkers and baconers, except for 3 sows kept for breeding, and the autumn litters of 30 pigs were held over the winter. In consequence, the returns for 1943-44, though still limited, were nearly double those of the previous season. The close of last season saw on hand 7 in-pig sows and 30 thriving stores.

Without crop reserves the alternative methods of meeting the winter position would be either to sell the 29 pigs as weaners, at about 15s or less, replacing in August with stores costing about £2, or of wintering them expensively on bought meal. Commonly, wintering pigs resolves itself into a struggle for the survival of the fittest. By August the remaining pigs coming through the winter are stunted and set back so far that profit is eaten up in the extra milk and longer time taken to get them growing and away fat. From his previous experience Mr. Holmes was well aware that adequate feeding of crops and meal was necessary to winter the pigs so that they continued to thrive and grow. Accordingly it was wisely decided to allocate a sufficient quantity of swedes and chou moellier, together with purchased barley pigmeal and molasses for wintering.

Results speak for themselves. In comparison with what is often to be seen elsewhere, the animals are vigorous and thriving. Marketed at the present time as heavy stores for buttermilk feeders, they would average over £3 apiece, providing a good return for the costs of wintering, though admittedly a fair amount of work has been involved. Carried on

By

A. T. SHANNON,
Field Economist, Hamilton.



Another Pedigreed winner added to the famous line of Tomoana feeding stuffs

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Tomoana Pig Concentrate is palatable—the best-liked foods are usually the best digested foods.

Tomoana Pig Concentrate is scientifically designed to supplement farm-produced foods. It is a complete concentrate for this purpose.

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BIG NEWS ON THE PIG PRODUCTION FRONT

Both Tomoana Meat Meal and Tomoana Fortified Meal are essentially protein supplements containing 60% protein, and only 2% carbohydrates at most. But as a result of their extreme popularity they are sometimes used in a general way as "all purpose" pig meals. This practice is wasteful of valuable and irreplaceable meat proteins, because many farm-produced foods already contain a measure of high quality protein in themselves, and the additional need may be as much for starch, minerals and vitamins as it is for proteins. In such cases Tomoana Meat Meal should be mixed with cereal to get the best results, and to make the available meat meal go as far as possible.

Many pig-farmers, however, have no facilities for mixing, and few if any have the technical means or equipment to test the value of separate ingredients so as to use them to the best advantage. This service is done for you under the guarantee of the brand "Tomoana," in the manufacture of TOMOANA PIG CONCENTRATE, and it is for these reasons that Tomoana Pig Concentrate has been developed. This complete ration is literally packed full of nourishment—proteins, carbohydrates and fats, and in addition is fortified with minerals, trace elements and vitamins.

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For all uses—except for mixing with cereal or to make up for an **extreme** protein shortage—TOMOANA PIG CONCENTRATE is the best food for pigs, being most concentrated, most economical and most effective. It is an all purpose Concentrated Pig Food.

to bacon weights in October-November these pigs should bring about £4 10s each.

Cropping Method

In cropping, a paddock of poorer pasture is ploughed each year, and only one crop taken before putting into grass again. Preparation requires the ploughing not later than September, followed by a thorough working up to a fine seed-bed. Then, as a protection against diseases the area is dressed with $3\frac{1}{2}$ to 4cwt. of lime and also 10lb. of borax per acre for the control of mottled heart. Rationing permitting, Mr. Holmes fertilises with 3cwt. superphosphate and sows with a drill, using every other coulter. Last year it was decided to put in the chou moellier and swedes together on 7 acres so that the more rapid growth of chou moellier would offer a protection to the swedes against the ravages of the white butterfly. Sown in the first week of December at the rate of 14oz. swedes and $\frac{1}{2}$ lb. chou moellier, the crop got away to a good start following rain.

In the coming season Mr. Holmes proposes to sow not less than 5 acres of swedes and $\frac{1}{2}$ acre of chou moellier for the cows and pigs, but this time as separate crops. His reason for not sowing together is because of some damage to the swede crops by the konaki when cutting the chou moellier. Profiting by experience seed will be sown at the rate of 14oz. for swedes and 14oz. for chou moellier. When asked whether he had considered growing maize to feed the grain to pigs Mr. Holmes cited the labour difficulties, especially on a 50-acre farm, and the chance of frost damage as objections to this crop.

The difference between selling autumn weaners or carrying on these pigs to bacon weight is, of course, a matter of feeding. Swedes and chou moellier alone are far from sufficient, and purchased food involved in feeding 30 stores, 7 sows, and 1 boar was as follows:—

	£	s.	d.
1 ton pigmeal	12	10	0
2 drums molasses	11	0	0
8 bags barley	6	18	0
	£30	8	0

In comparison, the gross returns from these pigs will approximate £120, whereas if sold as autumn weaners this would have been less than £30.

Boiling the Feed

A feature of pig feeding on this farm is that, excepting for the chou moellier, all the food is boiled. The faith that Mr. Holmes has in boiling can be seen from the fact that he has replaced a smaller boiler with one of 70-gallon capacity. The costs were low—£11 for the boiler, labour for installation £4 (old bricks used), 2



Store pigs wintered on boiled turnips (pulped) with meals, and green fed on chou moellier.

bags cement 18s, and 2 bags lime 11s. Since it is stoked with timber off the farm, fuel costs are nil.

Swedes that are brought in on the konaki go down a chute into a pulper driven by a light petrol engine. Pulp passing down another chute fills the boiler in a matter of minutes. To this is added water, a proportion of barley, about $\frac{1}{2}$ gallon of molasses to the 70 gallons, and, after boiling, the pigmeal. This stew is fed three times a day to the growing pigs. In addition the chou moellier is made available together with the raw swedes, this latter ration being given as well to the boar and sows, who also get a quantity of the hot food. A couple of weeks or so prior to farrowing the boiled food fed to the sows is increased, and this amount is maintained according to their condition.

The quantity of food boiled varies throughout the year, depending on the number of pigs on hand, their demands, and the supply of milk, but the use of the boiler is part of the daily routine. In summer, with no roots available, recourse is made to bought pigmeals, which are also prepared in the boiler. By working along these lines Mr. Holmes expects to be able to winter second litters from seven sows, when they farrow in autumn this year, and to carry them on to bacon weights.

First litters, due to arrive from now until September, can be expected to produce 50 weaners, though allowance must be made for maiden sows and the exigencies of maternity. If, say, even 40 pigs could be reckoned on, the planned disposal of these would be expected to work out approximately this way:—

	£	s.	d.
20 sold as slips, early December, at 30s	30	0	0
10 sold as porkers, end February, at £3	30	0	0
10 sold as baconers, early May, at £4 10s	45	0	0
	£105	0	0

Against this is offset some £25 of purchased meals. It will be seen that returns from the coming season promise well when it is remembered that only 30 milking cows are carried. This position is made possible by adequate feeding as outlined. The experience of years has taught Mr. Holmes that full results can come solely by putting in the work and by making supplementary meals and crops available. Concentration on intensified production after this manner is very necessary to make a success of a small farm, and it must be agreed that Mr. Holmes has indeed worked on a sound basis for contributing to the drive for pig meat for Britain.

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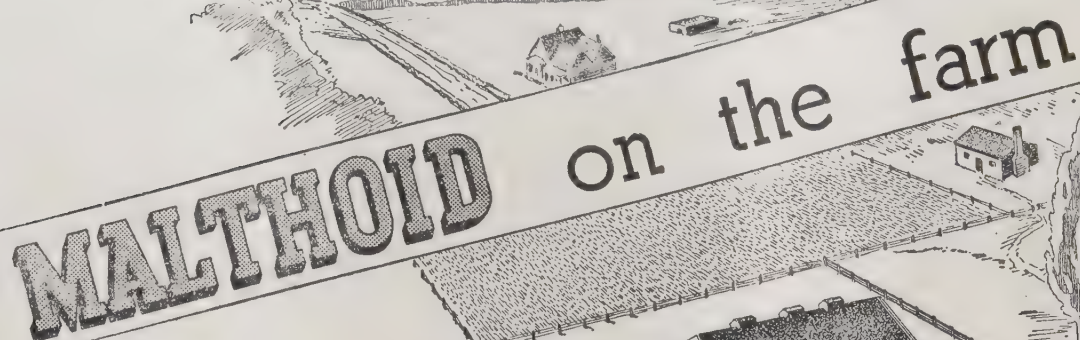
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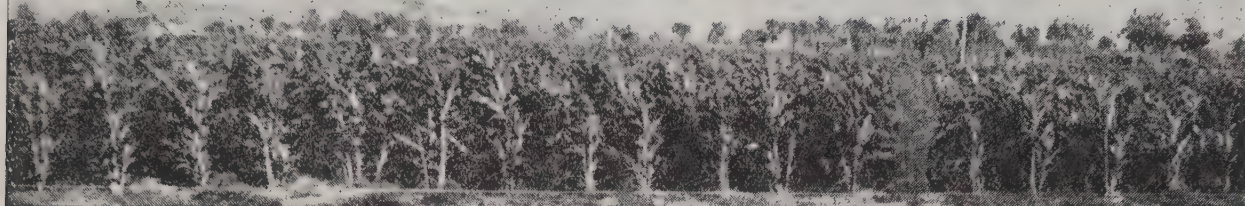
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MAIZE



IN the early days of land settlement in the warmer parts of the Auckland Province and in Poverty Bay the growing of maize was regarded as a lucrative occupation and as an excellent means of bringing in land from an unproductive state to good pasture country. Since that time—some 20 to 30 years ago—about 12,000 acres have been devoted annually to this crop in individual patches ranging from 1 acre to well over 100 acres.

LAND of high quality, such as rich river silts and good drained peat areas, together with other less fertile light soils, was freely and successfully used in the growing of this crop.

Later, as dairy farming began to develop, there was a corresponding reduction in maize growing, although for a number of years it was freely practised as an important occupation on many dairy farms.

Preparation for Pastures

The reasons for this were firstly that with the growth of dairying more areas had to be brought into grass. On much of the heavier land and drained swamps this could best be done by cropping with maize for one or two years prior to the sowing of permanent pasture. Such a preparation did much towards levelling the land and bringing the soil into better condition for grass establishment. Furthermore, the returns from maize provided a useful income and a sure method of paying for the land development.

The second reason for the retention of maize in the normal farm practices was provided by the fact that the main permanent pasture species could not be relied upon to give truly permanent pastures. Owing to weaknesses in strains it was often found that so-called permanent swards had so far deteriorated in a few years that they had to be broken up and renewed. In this connection maize for one or two years again provided a useful intermediate phase in farm development.

Cheap Grain

Finally, as a further reason for continued maize growing, the growth of the dairying industry brought with it a marked increase in pig and poultry production to use up the dairy by-products. The efficient utilisation of these by-products required the provision of cheap grain—a farm-produced crop—and in this respect maize fitted

sity now of regrassing every few years, and farmers are generally disposed to leave their pastures intact rather than to break them up for cropping. Furthermore, the development of most of the better-class country into high-class pasture has left very little land for further maize cropping as a preliminary to grassing.

Finally, owing to the shortage of labour over the past few years, there has been a definite "swing" from dairying to sheep. This has reduced the interest taken in pig-meat production, and has contributed in no small measure to the reduction in maize cropping.

More Maize Needed

Notwithstanding the objections usually raised to the growing of this crop, it cannot be denied that there is a considerable need for increased production, nor can it be argued that the crop is difficult to produce. On the contrary, even with very modest attention, it is not difficult to produce crops ranging from 60 to 100 bushels per acre, according to the quality of the land.

Maize is a very important cereal for feeding poultry and pigs, and every endeavour should be made to plant the 10,000 acres which the Dominion requires.

By
C. WALKER,
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Maize-growing Areas

Earlier it was mentioned that maize growing was confined to warmer districts. These in the main were the Gisborne flats; most of the river flats, shallow peat, and easy rolling country of the Bay of Plenty; a few favoured localities in the Waikato; and the more fertile soils of North Auckland.

A little maize growing took place in southern parts of the North Island, but in few instances was this a regular practice or one of any consequence.

Poverty Bay, Bay of Plenty, and North Auckland continue to produce the bulk of the maize grown, but the area has shown a tendency to shrink from year to year.

Preparation for Crop

As with any crop, the initial preparation of the land determines to a large extent the returns. Where ample time is taken and good work is performed yields will be correspondingly gratifying.

However, too little attention is usually paid to land preparation. Instead of ploughing early to allow of weathering, it is not infrequent to find grassland broken up not much more than a week before the crop is to be sown. This leaves no time for effective working, so that such crops are sown under a severe handicap.

A grower should know well in advance what areas he will be sowing in maize and should arrange to plough this land not less than two months prior to sowing. In fact, if he can arrange to plough in early winter, to be followed by a further ploughing in early spring, the added returns will well repay him for his labour.

Ploughing should be well done to a depth of at least 6in., and should be followed, in spring ploughing, by a rolling on the furrow.

About 10 days or so prior to sowing the area should be well disced to produce a fine seed-bed from the furrow bottom to the surface. This may require more than one double cut, and, on heavy land, it may be necessary to employ a clod crusher finally to break down surface lumps.

Tine harrows should then be brought in to aid in levelling and pulverising the surface. On lighter soils the area should also be rolled to improve consolidation, after which it will be ready for sowing.

The important point in preparation is to provide ample time for cultivation at each stage. Time is often a more important factor than it is given credit for, and hurried cultivation, no matter how diligently it may be performed, will not have the same effect on land as weathering processes over

a longer period when aided by better planned operations.

Seeding and Manuring

In most districts the usual practice is to sow grain in continuous rows, spaced from 2½ft. to 3ft. apart, with plants approximately 9in. to 12in. apart. Such sowing may be done with a two-row maize planter or with an ordinary grain drill suitably adjusted to sow in rows 35in. apart. Thus, with an 11-coulter drill, three rows may be sown at a time.

For such sowing it is found that about 14lb. seed per acre will be sufficient. This may vary from 12 to 16lb., according to varietal differences in grain size.

In some districts, notably Tauranga, where small areas are grown, the practice of sowing "on the square" has developed. To do this growers mark

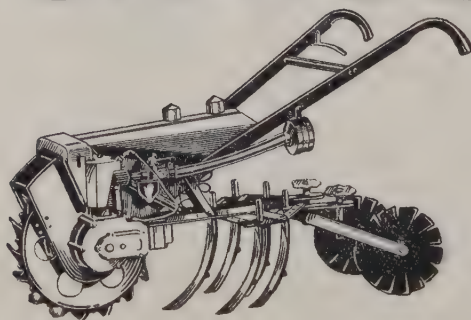
a field in lines one way, and again in a direction at right angles to the first. By this means they produce a squared pattern on the whole field. Three seeds are then dibbled in at each intersection. By having the crop so arranged subsequent intercultivation can be performed in any direction, so that weed control becomes very efficient. A sledge with three runners spaced three feet apart is used for the marking out of the field. For this method of sowing, which is applicable to small areas only, about 12lb. of seed per acre will be required.

In the manuring of maize it is customary to sow fertiliser through the two-row planter at the same time as seed is sown. These machines sow a maximum of 3 to 4cwt. per acre, so this figure has become an accepted rate on most maize areas. Owing to its ease of sowing, superphosphate has

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Horsetooth



Early Butler



Excelsior



Large Yellow Dent

been used more extensively than other fertilisers, although commercial firms have offered some competition with so-called "special maize manures."

Although superphosphate has been generally used, there is ample evidence to suggest that a mixture of superphosphate and blood and bone in equal parts would be a better general maize manure. Furthermore, when fertiliser supplies are again normal an increase to 5 to 6cwt. per acre on the lighter country would be advisable.

A limited amount of experimental work on the value of potash and nitrogenous fertilisers has indicated that, while slight improvements in yields have resulted from their usage, these have not been sufficient to offset the added cost of applying such fertilisers. One effect of applying them was that they slightly depressed germination and definitely delayed it. On the whole, then, the standard maize manure, for the present and until further experimental work can be carried out, should consist of superphosphate and blood and bone in such quantities as are obtainable.

Varieties of Maize

Under the conditions ruling in most of the maize-growing districts it is very difficult to keep a variety or strain pure for a lengthy period. The tendency for growers to introduce new varieties from time to time leads to an intermixture of strains and types, so that very often it is difficult to classify maize according to variety. Maize crosses very readily and the growing of several varieties within a small district soon leads to a loss of identity of all varieties.

Nevertheless, there are still a number of definite varieties which are often peculiar to certain localities. Thus in Gisborne Marigold and Prairie Queen are dominant varieties; Horsetooth and Early Butler are typical of Opotiki; Excelsior and Early Butler are Whakatane types, with Funk's Yellow Dent playing a lesser part; while in the Tauranga County Large Yellow Dent is the characteristic type. Of lesser importance, such varieties as Hickory King and Flint types are grown in small quantities throughout the maize districts.

Marigold: Grown on the Gisborne flats, and to a slight extent in the Whakatane district, this variety is a main-crop type requiring about 7 months to mature. It grows fairly tall and is rather light in the stem. Consequently, it tends to lodge if exposed to high winds or stormy conditions.

Cobs are very long and slender, with bright amber-coloured flinty grain, which is fairly small and shallow.

The grain withstands wet field conditions very well, so that even where the crop is beaten down there is less



Mixed strains give poor-quality cobs; seed selection is important.

tendency for the grain to sprout or rot than there is with other varieties.

On account of its small size it is particularly suited for fowl feed.

Yields are high on good land, ranging from 70 to 80 bushels per acre as a general rule, with some crops going close to the 100-bushel mark.

Prairie Queen: This variety is also commonly grown on the Gisborne flat. It is a main-crop type requiring about 6 months to mature.

Plants are somewhat shorter than Marigold and sturdier proportionately. The cobs are short and thick with yellow grain showing a tendency to white capping. The grain is fairly deep with a roughened dent, which almost suggests premature drying off of the grain.

The yields are generally in the vicinity of 70 bushels per acre.

Horsetooth: In general characteristics this variety is similar to Prairie Queen, but it tends to grow a little taller and the cobs are usually large. The grain is similar in general features, but the crop takes a little longer to reach maturity. This variety is the main-crop type of the Opotiki district, especially on the heavier lands.

Yields of 70 to 100 bushels per acre are not uncommon.

Early Butler: Of all the varieties commonly grown this is the earliest maturing, and also a very good yielding type. Plants do not grow very tall and stems are slender. Consequently it is not suited for exposed positions, as it lodges badly.

Cobs are of medium length, with deep, bright grain. The cap of the grain is drawn out into a distinct beak or hook, which is fairly sharp. This

characteristic gives the cobs a prickly surface, which is unpopular with harvesters.

The grain itself is fairly soft, and will rot if left for any time in contact with the ground.

Maturity is reached within 5 months, and yields will range from 60 to 70 bushels per acre on average good land.

Excelsior: Excelsior is a variety upon which much selection work has been done. Consequently it is now a type that is more uniform than most of the varieties being grown at the present time. It is a fairly tall-growing type, with sturdy stems that withstand winds very well.

Cobs are large, with grain of good depth. The grain is yellow, with a tendency to a white cap. The cap is usually quite smooth, with a definite dent.

Under trial this variety has yielded up to 140 bushels per acre, but the general average runs from 70 to 80 bushels or slightly better.

Excelsior is a main-crop type requiring a full 7 months to reach maturity.

Funk's Yellow Dent.—This variety is not well known, but is grown for early maturity. Plants are comparatively short and light in the stem. Cobs are also short and fine, but are closely packed with plenty of grain which makes them weighty and results in a good yield per acre.

Maturity is reached in 4½ months, and yields vary from 50 to 70 bushels per acre. As the grain is comparatively small it is very popular with poultry farmers.

Large Yellow Dent.—In the Tauranga County this variety is grown in

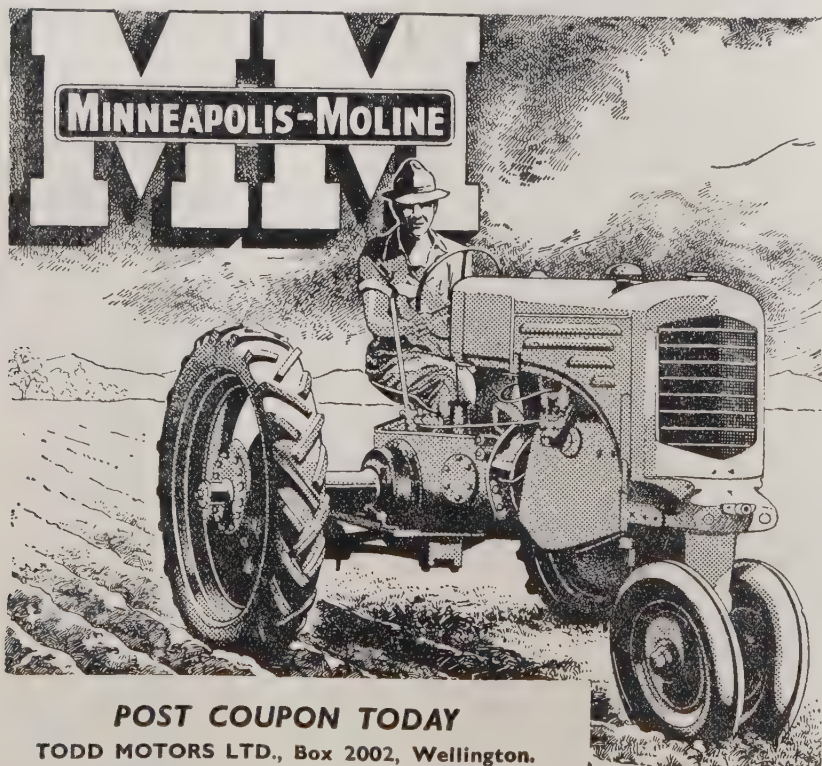


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preference to all others. It is a very tall variety, possessing stout stems that withstand winds quite well. The cobs are fairly long and thick. Grain is of medium depth, yellow, with a white cap, and a distinct smooth dent.

This is a main-crop variety requiring 6 to 7 months to mature. Yields are commonly in the vicinity of 70 bushels per acre.

Hickory King.—Hickory King is a tall-growing variety possessing stout stems and a large amount of leafage. The cobs are of medium size, with very large, white grain.

Whereas most of the yellow varieties have 14 to 18 rows of grain per cob, true Hickory King has only 8 rows.

The size of the grain compels one to crush it for poultry feeding.

Maturity is reached in 6 months and yields may range from 50 to 60 bushels per acre.

In general the variety is favoured more for green-feed than for grain production.

Flint Types.—Among Flint types are such strains as "Motiti" maize. Their chief characteristics are shortness of stalk, lightness of stem, earliness of maturity, and hardness of grain.

In general their yields are light, and under normal conditions they cannot be recommended in preference to the varieties already mentioned.

"Ninety Day" is a flint type which has largely lost its identity through crossing with other varieties. In a pure state it is now almost unknown.

Time of Sowing

Maize is very susceptible to frost, either in the early stages after sowing, during growth, or late in the season when grain is filling. Consequently, sowing must be done at a time when all danger from frosts has passed. With early-maturing varieties like Flint types or Early Butler sowing can safely be delayed until well into November, if necessary. However, with late-maturing types such a delay might considerably prejudice a crop in a district where snap frosts in autumn may be experienced.

As a general practice, then, it is better to sow by mid-October. Should a frost catch the young crop before mid-November there will still be time to re-sow the area; while, if Fortune smiles on the grower, he will be reasonably certain of getting his crop through to maturity without loss from autumn frosts.

Intercultivation, Weed Control

Crops taken straight after grass are not infested with annual weeds to the same extent as those grown in subsequent years. However, it is often in the second and third years after grass that maize is grown to follow a root crop. Consequently careful attention



Maize and pumpkins for pigfeeding.

has to be paid to intercultivation if the crop is to be kept clean.

The first operation, as the crop appears above ground, should be to harrow the area across the rows. A warm afternoon should be chosen for this work, and there should be no hesitation in carrying it out. The apparent damage to the crop is really of very minor importance, while the effect in checking young weed growth is highly beneficial to the crop.

Following this, when the crop is 6 to 8 in. high, the first intercultivation should take place. This should be fairly deep and close to the plants, as the first tendency in root development is for these to go down a few inches before branching out laterally and inter-locking across the rows.

Subsequent intercultivation should be shallower and more to the centre of row spaces, so as to avoid injury to feeding roots. Where crops are sown "on the square" intercultivation can be varied in direction to deal more effectively with weeds. In general intercultivation should continue at fortnightly intervals until further work would be damaging to the crop.

As a further means of dealing with weeds that avoid the cultivator it is a good practice to turn in large mobs of sheep for a few hours at a time during February when the crop is well established. These sheep will clean up all weeds and lower leaves, thus removing shelter for pests and also making conditions far better for harvesting.

Harvesting

Most of the harvesting is done by gangs of Maori labour at prices agreed upon per acre. This usually provides for all picking and bagging, while cartage to the crib is the responsibility of the grower. Prices for this work range from 30s to 40s per acre,

the higher rates usually ruling for Early Butler.

This work is usually a winter task performed during the months of May and June. While frost is damaging to the immature grain, it has no ill effect upon fully-ripened grain. In fact, a few frosts before harvesting make this work easier.

Storage of Maize

Following the harvesting of maize in the field, it is necessary to provide some storage space until such time as the grain is shelled from the cobs. It is necessary to bear in mind that maize freshly brought in from the field is not fully matured, nor is it sufficiently dry to permit of close storage in confined spaces.

Consequently, in addition to providing accommodation that will protect it from the weather, it is highly essential to provide conditions that will allow good ventilation and aeration so that full maturity of the grain may be attained. Normally, this will require about 6 weeks of storage, but frequently, owing to pressure of other work or to market conditions, the grower may be compelled to hold his crop for considerably longer periods, which often extend to several months.

Obviously, then, some attention must be given to the construction of serviceable storage sheds or "cribs," and, in order to assist growers, the designs with explanatory notes are incorporated in this article.

However, before dealing with these, it will be advisable to set out briefly the main requirements of a good maize crib. These are:—

(i) It should be made weatherproof, so far as practicable, by providing for a fairly liberal overhang at the eaves, and by building in a position where it will not be exposed to prevailing bad weather.

(ii) It should be made as vermin proof as possible by providing tin shields on piles, provided they are not less than 3ft. high, and by covering the crib with fine-mesh bird netting when this is again obtainable.

(iii) It should be built in such a manner as to provide ample aeration of the maize. This can be attained by building the walls of narrow battens suitably spaced, or by using wire-netting on a wooden framework.

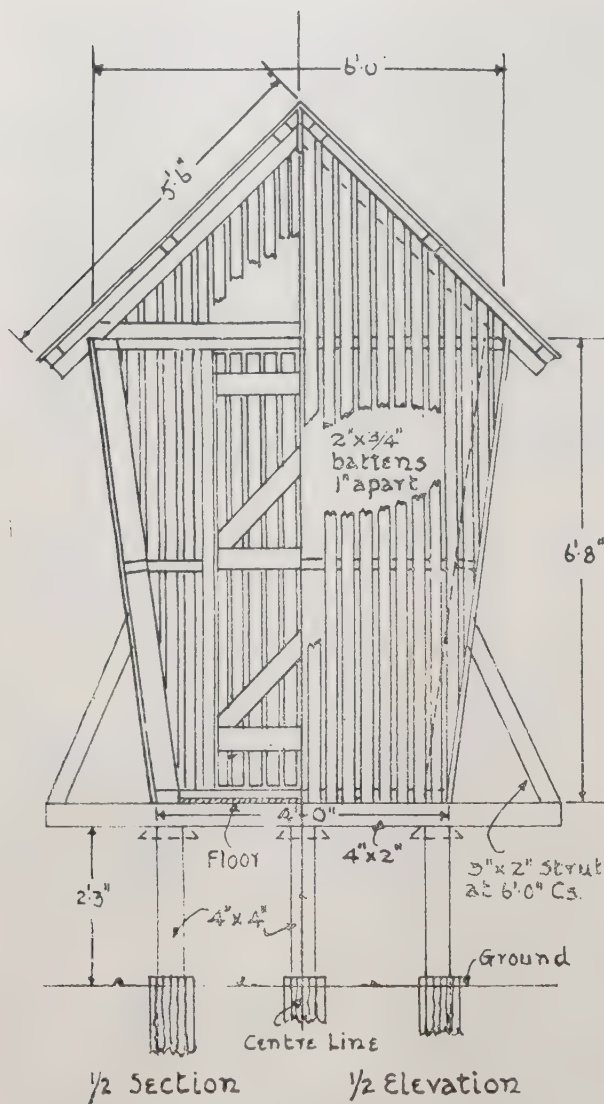
In addition, care should be taken to see that the crib is not more than 6ft.

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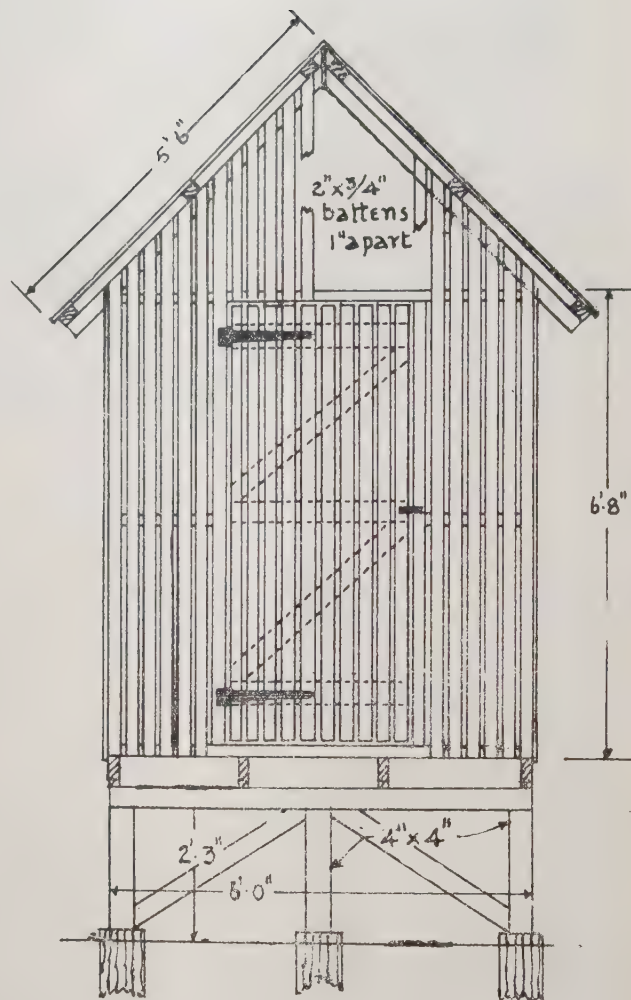


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in width. Otherwise sweating and heating will occur. Furthermore, in filling it is desirable to leave a space of about 1ft. between the roof and the top level of the cobs for air currents to pass over.

In general cribs should not exceed 6ft. in width nor 8ft. in height, but they may be any length, according to crop requirements.

(iv) Where maize is to be marketed instead of being consumed on the farm some importance is attached to brightness of grain. In order to attain this the crib should be built in a position where the crop will not be exposed to bright sunlight, as this has a bleaching effect upon the

grain, and may depress its value on the market.

Types of Cribs

In determining the type of crib to be employed one should first decide:

1. Whether maize growing is to be a regular practice.
2. What total acreage is likely to be grown each year.
3. Whether cribs can be used for other purposes on the farm.

Where maize is to be grown in relatively small quantities, but as an annual practice, a fairly permanent type of crib, such as those depicted above, would probably be the most suit-

able to erect. If the intention is to grow fairly large areas each year, a crib of this type, but considerably extended in length, can be employed, or the grower may erect the combined double crib and implement shed to serve the two-fold purposes of storing his maize and his implements

On the other hand, if a person intends to crop for only a few seasons as part of his land development policy, he may prefer to keep down costs by erecting a crib of type 3 or type 4. Both are freely used in maize areas and are reasonably satisfactory, but they cannot be expected to provide the efficiency in storage or the degree of protection from weather

and vermin that the more permanent types will provide.

The provision of a well-constructed crib, even for farms where maize growing is intended to be only a temporary feature, can be regarded as quite a sound investment if viewed from the angle of its value as a storehouse for tools, pumpkins, and chaff when not required for maize storage.

Thus, while maize is grown highly efficient storage is provided, and later a useful store shed is added to the collection of farm buildings.

Single Cribs.—The single maize crib shown in end elevation (type 1) is an old type employed very commonly in the early days of maize growing. The walls slope in from the eaves to the base, thereby providing added protection from the weather, but causing the weight of maize to add considerable stresses on the walls when the crib is filled. Consequently, struts to offset these strains have to be provided in the manner shown in the sketch.

As indicated in the sketch, these cribs taper from 6ft. in width at the

eaves to 4ft. at the floor level, while they are usually 7 to 8ft. in height. Length may vary according to the quantity of maize to be stored. Few of this type are now built, as it is recognised that the straight-sided cribs provide more storage space with less constructional problems.

A crib of the type shown as type 2 has practically superseded that of type 1 in all recent buildings because of its simplicity of construction and greater storage capacity. By having the walls vertical no undue stresses are placed upon them, and consequently side struts are not essential.

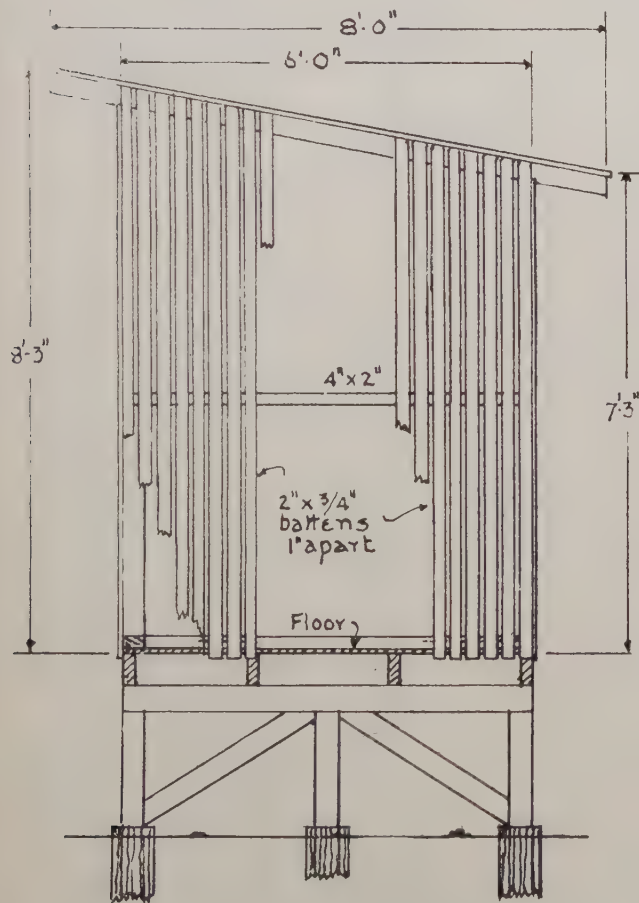
Type 3 shows a good type of crib with a lean-to roof. This crib is equally as efficient as the two former types, while the adoption of this type of roof reduces the cost of construction. It is therefore a good type for permanent maize growing or where a good building is desired for temporary maize cropping.

The type of building shown as type 4 is essentially a temporary one suited for areas where maize cropping is unlikely to continue for more than

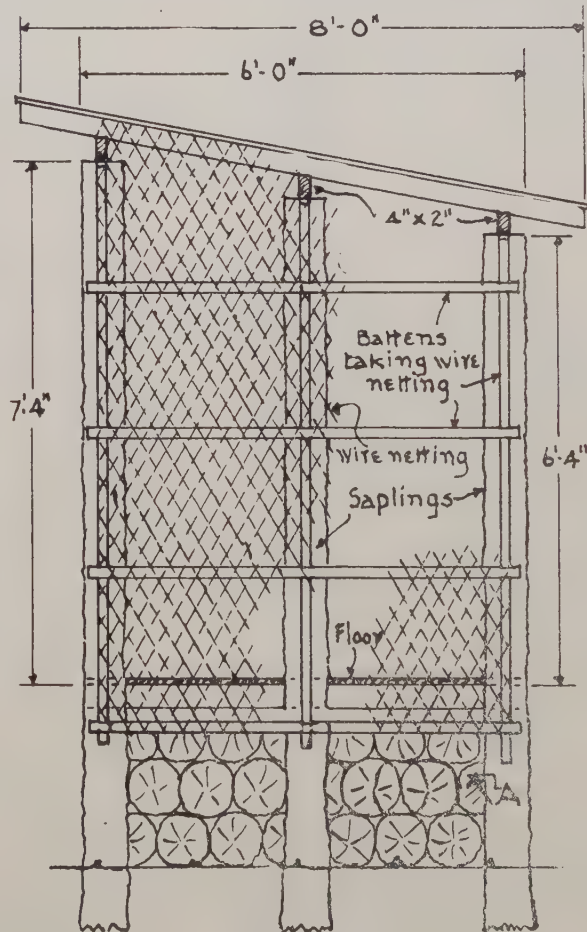
one or two years. The base may consist of odd limbs, roughly covered by boards. The uprights may be willow, gum, wattle, or any other timber that will last two years or so, while the whole frame is covered with netting, which should be supported by battens so as to give support. Such a crib cannot be recommended except for very temporary storage, and it should be recognised that losses due to vermin will be high in this type.

In every single crib it is important to provide doors for filling and emptying at both ends. In types 1, 2, and 3 these would be built of battens, while in type 4 netting doors on wooden frames are usually employed.

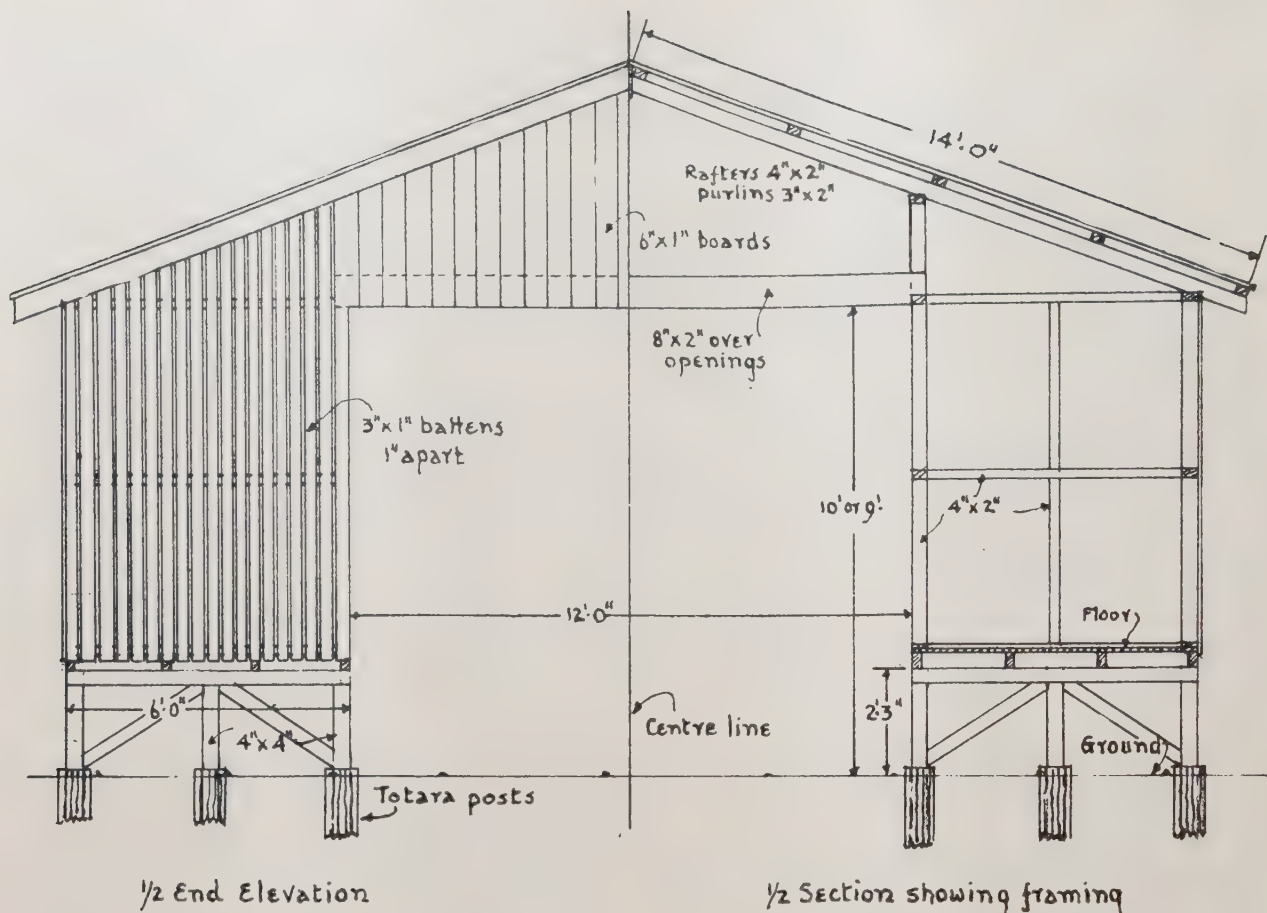
Double Crib and Implement Shed: Where farmers may have fairly large areas under crop and could benefit from the provision of an implement shed as well the sketch showing an end elevation of such a building will indicate the general lines of construction. Here we have a maize crib on either side with a 12ft space between for the housing of implements. Ample



End Elevation
TYPE 3.



End Elevation
TYPE 4.



Combined Double Maize Crib and Implement Shed.

height is also provided, but both these dimensions may be modified to suit individual requirements.

Capacities of Crib

As cribs are provided for the storage of maize in the cob, it is necessary to know in advance what space will be required for the crops to be grown. Yields fluctuate a great deal from district to district, and also according to the variety grown, but as a general rule it can be taken that an average good crop will require 6 to 8 ft. of crib length, assuming that the width and height are 6 ft. and 7 ft. respectively, for every acre grown.

Other Uses for Crib

Apart from the storage of maize during the period between harvesting and shelling, a maize crib provides an excellent storage place for other materials. Bran, pollard, other grain for pigs or fowl feed, and such commodities as meat-meal and stock licks can all be housed under dry condi-

tions and will be secure from the depredations of vermin. Likewise, farm-grown crops, such as pumpkins, may be held away from the adverse effects of weather. Tools, small implements, and a host of sundries may also be kept in such a building.

Thus, a maize crib need not be considered as having outlived its usefulness once maize growing has ceased. Rather will it prove to be a permanent asset, which may at any time be called upon to perform its original function, should a return to maize growing be decided upon.

Shelling and Marketing

Shelling, which takes place about 6 weeks or longer after harvesting, is also done in the main by contract. The usual price is about 1s. 6d. per 200lb. bag.

Marketing may consist of selling at the crib to a local agent, or of delivering f.o.r. or f.o.b. at the nearest railway station or port where the maize is being consigned to a distant produce merchant.

Dual Cropping with Maize

Throughout the Bay of Plenty, and particularly in western districts, it is the practice to sow some kumikumi or cattle marrow seed with the maize crop. By so doing a good crop of kumikumis is available for winter stock feed after the maize crop has been harvested. This is found to be particularly valuable for the wintering of both dairy cattle and pigs. The former consume the maize stalks and some of the kumikumis, while the pigs get any maize cobs that may have been overlooked or left through being partially damaged, as well as the balance of the kumikumis.

Maize and kumikumis grow quit well in association with one another, and, by such dual cropping, there is almost a certainty of one or the other, if not both, being completely successful.

However, the practice of sowing 2lb. of kumikumi seed intermixed with the maize seed could be improved upon. Such a system results in kumikumis appearing in every row; and,

as they are sown at the same time as the maize, they soon begin to run across the rows and prevent a continuation of intercultivation. Consequently, crops with kumikumis sown in this manner will be more likely to become choked with weeds.

A more satisfactory method consists of sowing the maize alone. Then, two weeks later, dibble in kumikumi seed in every fourth row. By so doing intercultivation can continue for a much longer period while the kumikumis are spreading.

It was mentioned earlier that sheep, used in February, are useful for cleaning up weeds in maize crops, but it should be understood that they could not be used where kumikumis are grown without greatly damaging this crop.

Farm Seed Selection

On the average maize area seed for succeeding crops is usually saved from the crop grown in the preceding year. Occasionally an effort is made to introduce a new strain by purchasing seed, either from a produce merchant or from another grower. As a general rule, however, seed from these two latter sources is no better than, and often not so good as, seed that could be saved from the farm-grown crop.

In the absence of a seed certification system the production of seed maize for sale leaves a great deal to be desired. Examination of many lines has indicated very clearly that much nondescript material finds its way into these channels, and the growing of crops from such lines is unlikely to give satisfaction. In fact, just as with certain pasture strains prior to certification, it is highly probable that much of the dissatisfaction with maize could be traced to the use of inferior seed.

Nevertheless, where seed is to be bought in there are reliable sources among growers who make a specialty of certain varieties. Consequently the best advice that can be given is that such strains should be procured in the first instance, and then subsequent seed selection could be practised on the farm.

In farm selection certain bad practices have developed, and perhaps the worst of all is that of selecting for seed from the crib. Here it is common to find a person taking out all the big cobs until he has sufficient for his seed purposes. It cannot be denied that the selection of big cobs is sound under certain conditions, but, unless these conditions have been fulfilled, there is no certainty that such cobs will provide high-yielding crops.

For instance, it is an established fact that the outer rows in a crop will provide sturdier plants of higher

yielding capacity. It is just possible then in crib selection that one will take many cobs that were grown under very favourable conditions. Furthermore, it is very desirable to know whether a cob was well covered; whether it adopted a pendant position to protect it from weather conditions; whether it was well placed on the stalk; and whether the stalk itself was sturdy or slender. None of this information can be obtained from crib selection, so therefore that system of selection must stand condemned.

A far sounder method is to examine the crop carefully before harvesting, and select good cobs from within the crop, and only cobs that conform generally to the above requirements. Cobs should also feel weighty, have deep grain of good shape with good even rows of grain, and both ends of the cobs should be well filled. In general, the cob should be cylindrical rather than tapering to any marked extent. This method of selection is not laborious, as only 14lb. of seed per acre to be grown is required. Furthermore, the work of selection becomes very interesting as it proceeds.

Pests and Diseases

The maize crop in New Zealand is comparatively free from serious pests and diseases. Occasionally early crops grown in close proximity to hedges or plantations may be attacked by the grass grub beetle in late spring, but the damage from this source is neither regular nor serious.

In late summer cutworms may become fairly troublesome at times. On occasions they may almost defoliate the crop, and they will also attack the cobs while the grain is in the doughy stage. Cutworms are most troublesome where weed control is least efficient, and much can be done to reduce their damage to crops by keeping up intercultivation as long as possible. The employment of sheep for weed control, as advocated, will also assist by destroying the protection that such weeds afford this pest.

In the grain there is occasionally some weevil infestation, but this is by no means common. Where it does occur fumigation may be practised, or the grain may be boiled and fed to pigs.

Disease infection, apart from a mild occurrence of pink cob rot, is practically unknown. Pink cob rot has the effect of shrivelling the grain before it reaches maturity. There is no known preventive treatment for this disease.

Farm Uses of Maize

In concluding this article, it may be of interest to mention a few of the

purposes to which maize is put on New Zealand farms. In the main its value lies in its suitability for the winter feeding of pigs. Autumn litters can be carried through the winter from weaner to store stage on a minimum of milk, together with a ration of grass and maize.

This maize is fed to such pigs, either as loose grain scattered on the grass, on the cob, or as soaked or boiled grain. Practical experience has shown that the amount needed to bring each animal through the winter period is in the vicinity of 2 to 2½ bushels.

Poultry farmers also employ maize quite freely. In itself it is considered rather fattening, but when crushed and mixed with other grain or fed with skim milk it provides a good egg-producing ration. Returns from poultry that have been fed in this manner have been claimed to reach 15s to £1 for every bushel of maize fed.

In addition, crushed maize has also been used in the rations of working horses, while maize meal has been employed in the feeding of dairy cows and calves.

It will be apparent, then, that this crop plays an important part in farm economy. Its employment in land development has frequently provided sufficient to pay for the cost of operations, while its influence on the development of pig and poultry farming as adjuncts to dairying has been most marked.

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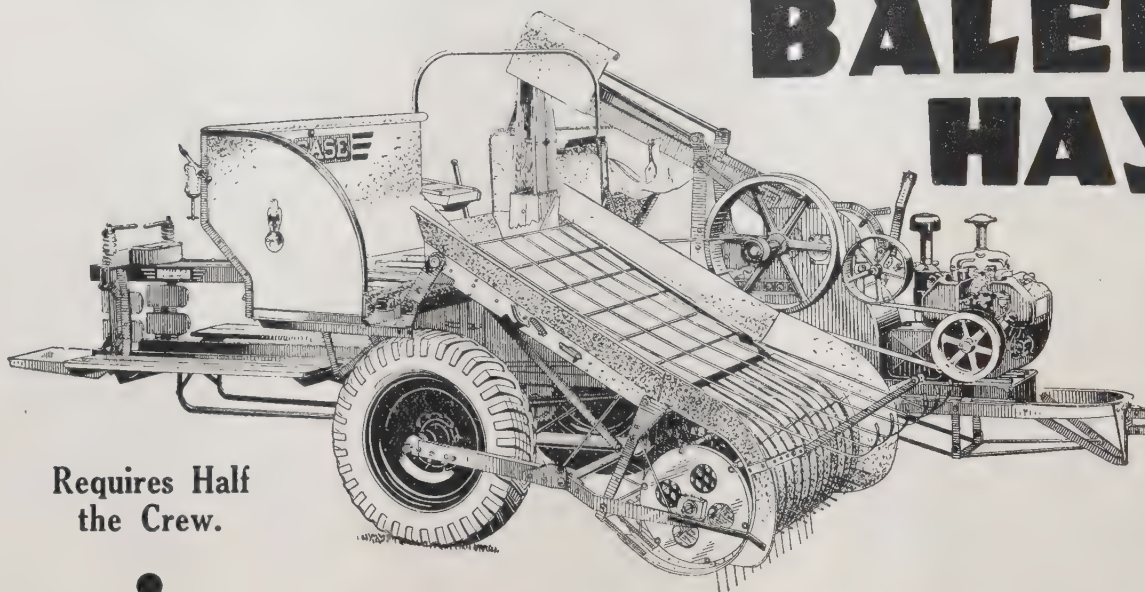


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Vaccination Against Contagious Abortion

A great variety of vaccines have been tested over a period of many years for the control of contagious abortion in cattle. The vaccines have varied from dead organisms to fully-virulent strains, and in the past have been extensively used in other parts of the world until critical analysis of the results of field trials has indicated their true value in the control of the disease.

DEAD vaccines were shown to be ineffective in conferring immunity against the disease, while vaccines prepared from fully-virulent strains were found to be capable of causing permanent infection. Experiments were then designed to find methods of immunising cattle without infecting them. It had been observed that the susceptibility of female cattle to infection varied at different periods of their life, calves being less susceptible than older animals and pregnancy greatly increasing susceptibility. Also it was demonstrated that laboratory strains of the causal organism varied greatly in virulence, thus offering the possibility of utilising strains for vaccine work of standardised reduced virulence, which, while capable of inducing a serviceable immunity in the vaccinated animal, would not cause permanent infection.

American Research

American workers have been very active in this field of research; they developed a strain of the causal organism of contagious abortion having reduced virulence which they advocated for calfhood vaccination. An extensive field trial was conducted by the American authorities to determine the value of this strain of the organism for the vaccination of heifer calves in badly-infected herds, and these results were published in 1941. The results were definitely most encouraging, and since 1941 calfhood vaccination with strain 19 has been

— By —

M. B. BUDDLE,
Veterinary Research Officer,
Animal Research Station,
Wallaceville

given official recognition in schemes for the control of contagious abortion in the United States. The American authorities have discouraged over-enthusiastic expectancies in the use of the vaccine, and its preparation and use in the field are rigidly controlled.

Introduced to N.Z.

Through the courtesy of the American Bureau of Animal Industry, a culture of *Brucella abortus* strain 19 was introduced into New Zealand in 1941 for experimental work. Laboratory-controlled experiments and small-scale field trials were commenced immediately in Government herds, which provided experience and some indication of the vaccine's value and safety under New Zealand conditions.

In a laboratory-controlled experiment a group of pregnant heifers

which had been inoculated with strain 19 vaccine as calves and another group of unvaccinated animals were artificially exposed to a severe infection of the causal organism of contagious abortion. Of 15 unvaccinated pregnant heifers so exposed, 10 aborted, while 12 out of 14 of the vaccinated animals resisted infection and calved normally, indicating a high degree of resistance to severe infection in the vaccinated animals.

Wide-range Trial

In 1942 630 calves and yearling heifers in 33 privately-owned dairy herds in the North Island were vaccinated against contagious abortion to study the behaviour of vaccinated animals under a wide range of environmental conditions. These vaccinated animals calved in 1943, and through the co-operation of keenly-interested farmers records of the first pregnancies of 465 vaccinated animals are available.

In the table the abortions in the vaccinated heifers in these herds in 1943 are compared with the abortions in the unvaccinated heifers in 1942 and the unvaccinated cows for both years. It will be seen that while the incidence of abortions varied very widely on the different farms, the average rate of abortions in unvaccinated heifers in 1942 was 32 per cent., which well exceeds the New Zealand average of 10 per cent. for heifers. Of the vaccinated heifers in these herds in 1943, less than 5 per cent. aborted. That the disease was still active in these herds in 1943 is indicated by the abortion percentages

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1942.					1943.				
Heifers Unvaccinated.		Cows Unvaccinated.			Heifers Vaccinated.		Cows Unvaccinated.		
Herd.	Heifers Mated.	Abortions.	Mated.	Abortions.	Heifers Mated.	Abortions. Empty.	Mated.	Abortions.	
1	80	35	182	24	64	3	4	191	22
2	22	2	81	1	26	1	1	—	—
3	14	0	78	1	21	1	0	90	1
4	11	0	49	7	10	0	1	52	0
5	13	4	49	4	15	1	0	38	3
6	10	4	94	2	22	0	1	53	2
7	9	2	30	3	11	0	0	26	5
8	2	0	37	1	4	0	0	22	5
9	4	0	48	2	12	0	6	48	2
10	18	0	93	0	12	0	0	—	—
11	—	—	100	6	18	0	0	56	3
12	35	12	92	6	31	1	—	—	—
13	14	11	53	12	15	3	1	73	17
14	17	4	38	19	10	0	0	35	6
15	14	6	40	5	14	2	0	42	5
16	11	3	58	6	15	2	1	18	1
17	15	6	54	16	11	0	3	62	9
18	12	7	37	3	16	0	5	40	7
19	16	7	49	2	13	0	1	65	6
20	12	6	46	3	11	2	0	52	1
21	6	3	57	1	18	0	0	46	1
22	12	1	35	7	7	2	1	33	1
23	20	7	74	4	12	1	0	100	10
24	51	12	154	24	51	3	0	173	62
25	12	3	70	7	26	0	2	78	9
420		135	1,707	166	465	22	27	1,393	178
32.1%				9.7%	4.7%	6.7%		13.5%	—

in the unvaccinated mature cows, 9.7 per cent. in 1942 and 13.5 per cent. in 1943, figures which are higher than the New Zealand average of 4 per cent.

Calfhood vaccination did not have any apparent detrimental effect on fertility, as less than 7 per cent. of the vaccinated heifers failed to conceive as compared with the New Zealand average of 10 per cent.

When it is considered that the abortion figure for the vaccinated heifers also includes abortions due to other causes than *Brucella abortus* infection, which could not be prevented by vaccination, these preliminary results are most encouraging.

Department Extends Tests

In September, 1942, the Department of Agriculture made possible an extensive trial of strain 19 vaccine in New Zealand dairy herds. Commencing in February, 1943, 18,332 heifer calves in 1,160 privately-owned dairy herds were inoculated by field officers of the Livestock Division and Veterinary Clubs. These heifers will complete their first pregnancy this year, and it is anticipated that much valuable information of the efficacy of calfhood vaccination with strain 19 in the control of contagious abortion will become available.

From information supplied by farmers the abortions from all causes in these herds in the season prior to vaccination are summarised in the accompanying table.

This season the calf vaccination scheme against contagious abortion was extended to embrace 2,100 herds, involving approximately 40,000 animals which will come into production in 1945. These herds had experienced 23 per cent. abortions in heifers and 9 per cent. abortions in mature cows last season.

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	Total Number of Cows in Herds.	Total Number of Abortions from All Causes.	New Zealand Average
Two-year-olds	14,719	3,782 25.7%	10%
Three-year-olds and over	54,868	4,996 9.1%	4%

The preliminary results of the use of calfhood vaccination with strain 19 to reduce the incidence of abortions in badly-infected herds have been definitely encouraging. It is anticipated that with the co-operation of the farmers participating in the scheme more extensive information on the

behaviour of vaccinated animals under a wide range of environmental conditions will be obtained and a reliable opinion formed of the value of *Brucella abortus* strain 19 vaccine in the control of contagious abortion in New Zealand.

Department Must Know Results FUTURE POLICY DEPENDS ON EARLY RETURNS

MR. Buddle's article gives the results which have been obtained from vaccination against contagious abortion in the few herds in which this was carried out in 1942. By this time the 1,160 dairy farmers whose calves were vaccinated in 1943 will know what results have been obtained in their herds.

Information Required

The Department of Agriculture is most anxious to obtain details of these results as soon as possible, for on them must depend the future policy in regard to the control of contagious abortion. Printed forms No. Ag. A/11 were issued to all dairy farmers when their calves were vaccinated. They are earnestly requested to fill these forms in now and send them in without delay. If the form has been lost, another can be obtained from the nearest office of the Department of Agriculture or from a Farmers' Veterinary Club, if vaccination was conducted by a club veterinarian.

calves, normal calvings, and empty does not add up to the number of cows mated, please indicate why, e.g., two died, one sold, etc.

Abortions and Full-Time Dead Calves in Vaccinated Cows: Please note that details are required in this section for vaccinated cows or heifers only. Be careful to fill in the identification marks, as these are necessary to enable results of blood tests to be tabulated.

Applications for Vaccination of This Year's Calves: On the opposite side of the form will be found space for the application for vaccination of this year's calves. It will assist greatly if all applicants will fill in the identification marks when making their application, as this saves a lot of work for vaccinating officers and clerical staff. If individual ages of calves are not known, the dates of birth of the

How to Fill in Form

Filling in the form should present no difficulties. First complete the "Breeding Summary" for heifers and cows which have calved this season. There are four columns—for 2-year-olds vaccinated, 2-year-olds non-vaccinated, 3-year-olds and over vaccinated, and 3-year-olds and over non-vaccinated. The age is the age at calving. Remember that an abortion is defined as any calf born under 8 months which fails to live. If it is born more than 8 months after the last service and is dead at birth or dies immediately after birth, enter as a full-time dead calf. If the calf lives it should be shown as a normal calving, no matter when the last service occurred, as cows sometimes accept service when they are in calf. If the total of abortions, full-time dead

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All equipment is located in North Island. Tenders close with the Department of Agriculture, Wellington, on **November 15th, 1944.**

youngest and oldest calves must be given.

Enquiries are often received regarding vaccination of older animals. In general, vaccination of cows is not recommended, as vaccination has no effect on any animal already infected, and, moreover, in most herds the incidence of abortion is much greater in heifers than in older cows. However, if serious trouble is being experienced in older cows, arrangements can be made to vaccinate these, but they must be empty at the time of vaccination and must not be mated for one month after. In such cases dairy farmers are recommended to consult the nearest veterinarian. Vaccination of bulls is not recommended.

New Applications

If applying for vaccination for the first time, use Form Ag.A/14, which may be obtained from Departmental offices or from Farmers' Veterinary Clubs.

Apply Early

Calving should be over by the time this notice appears, and there is, therefore, no reason for delay in applying for vaccination. Early application will greatly assist the Department, as it is necessary to know well in advance how much vaccine will be required. In previous years there has been a tendency for applications to straggle in right up to mating time, and some dairy farmers have been very indignant when there has been a few weeks' delay in vaccinating calves for which the application was several months late. It is expected that there will be a very heavy demand for vaccination this year, and no guarantee can be given to supply vaccine for applications received after December 1. If you belong to a Veterinary Club, forward your application to the secretary. All other dairy farmers should forward application to the Director, Animal Research Division, Department of Agriculture, P.O. Box 3004, Wellington.

The Departmental veterinarian or stock inspector or the club veterinarian will advise later concerning the date of vaccination, which will probably be in January or February, or, in late-calving herds, in March. Vaccination this year will again be free.

MASTITIS IN DAIRY COWS

Mastitis causes greater loss to the dairy industry in New Zealand than any other single disease—in fact, 3½ dairy cows in every 100 are culled annually. Recent investigational work into this problem is dealt with in a bulletin "Mastitis in Dairy Cows" which is issued free by the Department of Scientific and Industrial Research.

Turnip and Swede Seed

QUALITY OF NEW ZEALAND-GROWN GOVERNMENT APPROVED SUPPLIES

No supplies of turnip or swede seed have been imported to New Zealand for the last three years, during which time farmers have been dependent on locally-grown seed, the bulk of which has been grown under Departmental supervision and distributed as "Government approved" seed.

THE first distribution of Government approved seed was made in 1941, and to date a total of 80 tons of swede seed and 75 tons of turnip seed have been marketed in New Zealand. At a conservative estimate this seed would sow at least 400,000 acres, and many farmers are asking the question, "Is the locally-grown Government approved seed we are sowing now as good as the imported seed we used pre-war?"

There have been many individual expressions of opinion on this very pertinent question, but perhaps the best answer can be obtained from the following reports to hand from sources best able to judge the various qualities:—

1. Germination: The official figures of the Seed-Testing Station reveal that the germination of the Government approved seed is at least as good as that of imported seed.

2. Freedom from Disease: Dry rot is a disease the initial infection of which may be introduced with the seed. Samples of seed from various crops grown under Departmental supervision were forwarded to the Plant Diseases Division of the Plant Research Bureau for examination. The report of the Division on these samples was as follows:—"Results of last year's tests showed that very little dry rot was present in the New Zealand-grown samples. They are certainly less infected than the average imported seed of a few years ago."

3. Purity of Strain: Samples of all varieties available in 1942 were forwarded to English seed houses to obtain their opinion of the seed being grown locally under Departmental supervision. The reports received are too lengthy to publish in full, but the following extracts are typical of the comments made:—

SWEDES: Superlative—Typical stock and good crop.

Grandmaster—Nicely shaped roots; good stock.

Crimson King — Typical stock and good crop.

Resistant—True stock of variety.

TURNIPS: Green Top Yellow—Comparable to English

stocks of this variety; good crop.

Purple Top Yellow—Similar to English stocks of the variety; good crop.

Purple Resistant — Compares with English-grown seed.

Green Globe — A good average stock.

Red Globe—Good sound bulbs; heavy crop.

Finally a report appeared in the "Southland Times" of June 3, 1944, which expressed the opinions of farmers who had been given an opportunity of inspecting the trial grounds where seed from single plant selections was being tested and where samples of New Zealand-grown "Government approved" seed were growing in close proximity to samples of imported seed of the same variety from different origins. This report outlined briefly the work which was being undertaken in connection with the raising of stock seed of turnips and swedes for sowing commercial seed areas. It referred to the trials which had been made with New Zealand-grown seed and imported seed for comparison, and stated that each test showed clearly that the New Zealand seed compared favourably with the imported lines.

At the conclusion of the inspection the president of the Southland Provincial Executive of the New Zealand Farmers' Union, in moving a vote of thanks to Mr. Wallace, of the Department of Agriculture, who had conducted the inspection, said that from what they had seen that day none of them could say that imported seed was better than New Zealand seed.

He added, "You are doing a wonderful job and I feel sure that we can look forward with confidence to even better seeds. There are definite prospects from what we have seen today for New Zealand seeds."

—J. H. CLARIDGE,
Seed Certification
Officer, Wellington.

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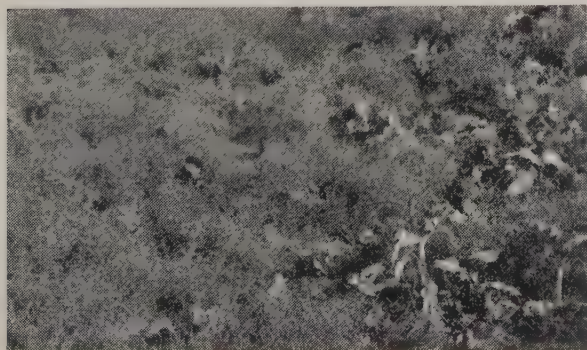
Turnip Growing In Canterbury

Out of a total of 240,000 acres of fodder crops grown in Canterbury in 1941-42—the latest year for which figures are available—turnips and swedes hold pride of place. Ninety-three thousand acres were sown with these roots, either alone or with new grass, and another 7,500 acres were sown in mixtures of turnips and rape. In South Canterbury swedes, together with a small acreage of the yellow-fleshed or Aberdeen varieties, comprise approximately half the area sown, but in Mid-Canterbury and North Canterbury the white-fleshed varieties are more popular. In these districts 80 per cent. of the acreage is in the white-fleshed or earlier varieties, only 20 per cent. being sown in swedes or Aberdeen turnips.

THE value of a good crop of turnips is recognised by all farmers, but, owing to the uncertainty of the crop in some of the lighter-rainfall areas, blue lupins have increased in favour of latter years and turnips are gradually waning in popularity. However, turnips are still a very popular crop.

Place in Rotation

Owing to our method of extensive rather than intensive farming the practice of a four or six-year rotation, including a crop of roots in the regular cycle of other crops, as is practised in some parts of Britain, is not carried out to any great extent in this country. Turnips are sown primarily as an extra food supply for the autumn and winter, when pasture growth is not sufficient for the normal carrying capacity. As a general rule they are not carted off the field and hand-fed to stock but are grazed as they stand. Turnips belong to the same family as rape, kale, and cabbage, that is, they are all brassicas, and as such are subject to attack by the same insect and fungoid pests. In some districts the turnip crop is sown following a crop of rape, but where clubroot is prevalent this rotation should not be practised if good crops are required; rather should they be sown after greenfeed or pasture.



Spurrey, or yarr, is a serious weed in rape and turnips. Fortnightly harrowings before sowing will do much to check the pests.

— By —

R. INCH,
Fields Instructor,
Ashburton.

Although no hard-and-fast rule can be laid down, it is recognised as a generalisation that turnips grow best on land that has been ploughed early out of grass, as the heaviest turnip yield is obtained when the soil is richest in humus.

On light sheep country early ploughing of old grass, with subsequent fallow and cleaning cultivation, then resowing the pasture with the turnip crop is at times carried out with good results. On cropping land early turnips may be followed by autumn wheat, and later crops by spring-sown wheat, oats, barley or peas, or, if a really first-class pasture is desired, by grasses and clovers.

Cultivation

Where turnips are required for early autumn feed the land should be ploughed during the winter months.

One ploughing to the depth of about 5in. is sufficient, and if the furrow is left up to the frost until the spring, other cultivation can then be commenced as climatic conditions permit.

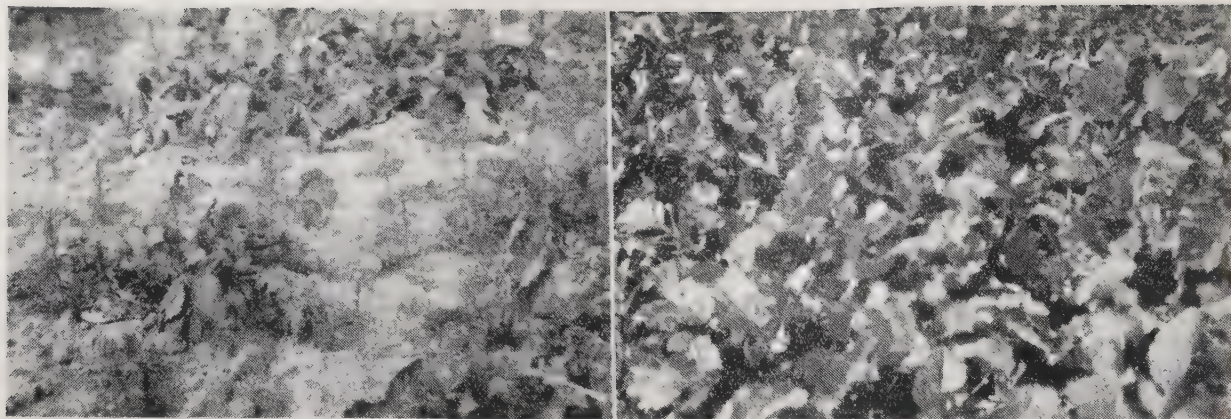
In the case of land out of grass early ploughing allows all the old turf to rot, building up a good supply of humus. As a general rule it may be observed that the greater the amount

of turf the earlier the land should be ploughed. Cultivation should be aimed not only at killing weeds but at producing a firm, fine seed-bed, with soil moisture within half an inch of the surface at time of sowing. An open or loose seed-bed often results in the seed being either buried too deeply or else left in the top soil away from the moisture. It also may result in the soil drying out quickly with consequent slow germination and poor establishment.

Heavy cultivation, such as discing, should be carried out as early as possible, working the ground to the desired depth to break the furrow and kill the perennial weeds. After this light harrowing at intervals of every 10 to 14 days will kill any seedling weeds and give a good firm tilth on the surface. Farmers should remember that every time a cultivator is used in a field fresh weed seeds are brought to the top layer where conditions are ideal for their growth. Most weed seeds are very small and small seeds need to be reasonably close to the surface before they will germinate. Harrowing at intervals kills seedling weeds while they are still tender, helps to consolidate the ground, and keeps the moisture near the surface, thereby assisting a quick germination of the turnips when sown. Where necessary



29 H.B. MEN'S STORES—
Whangarei to Invercargill.



Left: Badly-prepared seed-bed results in poor strike, the large areas of bare ground encouraging weed growth. *Right:* A strong, healthy crop suppresses weed growth and conserves soil moisture.

the field may be rolled prior to drilling.

While the best crops are grown on a good deep loam where the rainfall is at least 25in., turnips are grown on nearly every soil type in Canterbury. Rainfall and the conservation of soil moisture are limiting factors on the lighter land. Crops that receive a check or are unthrifty through lack of moisture are always more subject to damage by insect or fungoid pests.

Seeding and Manuring

The rate of sowing varies slightly under different conditions, a lighter seeding being usual when sowing down with grass. As a rule 8-10 oz. of seed per acre is sufficient when sown in 14 in. rows. This is close enough when sowing down to pasture, as it gives the young grass plants a chance to develop. Indeed, if producing a pasture is the primary object, even less seed could be used. For sowing turnips alone it will usually be found that 10-12 oz. sown in 7 in. rows will give the heaviest crop. Naturally the bulbs will be a little smaller than when spaced wider apart, but the total weight of the resultant crop will be heavier. Occasionally crops are sown in 21-28 in. rows and intercultivated, but this method is suitable only for relatively small areas.

A thick stand is preferable to a very thin one as it provides cover on the ground more quickly, thus suppressing weed growth and conserving moisture in the soil. Where the crop appears too thick it can easily be thinned by a stroke of the harrows across the rows as soon as the plants are strong enough to withstand smothering by soil movement. This harrowing will also assist in checking any small weeds that may be present. If this practice is carried out a seeding of up to 16 oz. can be used.

Turnips should be sown with a phosphatic fertiliser, as experiments have

shown that this is profitable on account of the resultant greater yield per acre. Superphosphate reverted either with lime or serpentine is more suitable for sowing with turnips and similar small seeds than is straight superphosphate, since the latter is very liable seriously to reduce germination, especially under dry conditions.

Time of Sowing

Sowings of white-fleshed varieties for late summer or early autumn feed should be carried out during the latter part of October or early November, according to locality. In sowing early

turnips one should aim at having the crop well-advanced into the rough leaf stage before the heaviest attack of brown beetle takes place. Many crops germinating whilst this attack is at its height are destroyed and have to be resown. After the attack has passed sowings can be continued once more and may be carried on up to the end of January.

Varieties

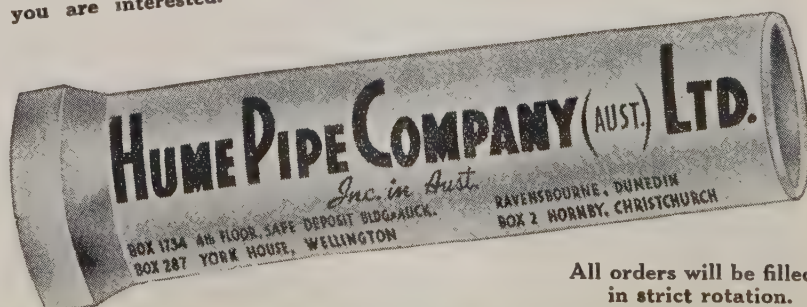
The very early varieties, often called lamb turnips, mature quickly under favourable conditions, but will not keep in good condition for any length

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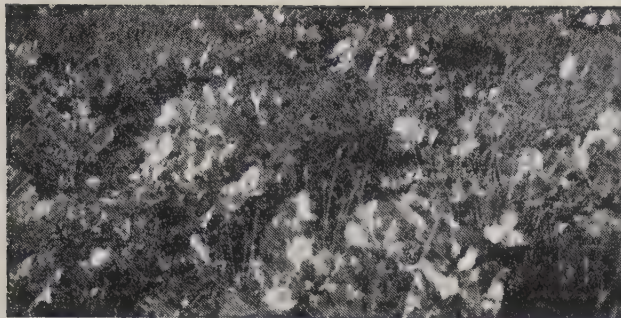
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Left: A thin crop provides shelter for grasses and clovers. Right: On good, well-prepared soil sowing in 7 in. rows gives a good crop.

of time. If used to any great extent they should be sown in several blocks and the sowing spaced over a period of several weeks. When this is done they can be fed off before they begin to deteriorate. They are mostly used on the lighter land or for lamb fattening. New Zealand Purple Globe is the earliest variety and New Zealand Red Globe a good second early.

New Zealand Green Globe is the most suitable white-fleshed turnip for all-round use. Though later than the two previously named, it grows relatively fast and has better keeping qualities than the other white-fleshed varieties. It is very suitable for light land and for early crops on the colder soils. The area sown in Green Globe is probably 80 per cent. of the total turnip acreage in Canterbury.

The yellow-fleshed or Aberdeen varieties, New Zealand Purple Top Yellow, New Zealand Purple Resistant, New Zealand Green Top Yellow, and New Zealand Green Resistant, are more suitable for the colder districts, or where the rainfall is high. Being more hardy they are slower growing than the white-fleshed varieties, but are less susceptible to damage by heavy frosts. They also have excellent keeping qualities. The Resistant varieties have been specially selected as more resistant to the ravages of club root and should be sown in districts where this disease is prevalent. Of the yellow-fleshed varieties the Purple Top Yellow is slightly earlier than the Green Top Yellow.

Feeding

Owing to the large percentage of water they contain turnips are never a complete ration for stock, but where fed with oatsheaf chaff or good-quality hay and perhaps a little bran or meal-meal the balance is maintained and stock will thrive on them in the coldest weather. While no hard-and-fast rule can be laid down as to the area of turnips required for each farm, 5 per cent. to 6 per cent. of the acreage of a mixed farm should be sufficient. On sheep country this percentage can be considerably increased. Indeed, on some of the lighter land where pastures have

to be renewed at frequent intervals relatively large areas are grassed down with turnips, the surplus over the farmers' own requirements being sold to owners of hill country flocks for wintering their sheep.

Stock should never be allowed to wander over the whole of a field of turnips, as many roots damaged early in the grazing will often be partially or wholly destroyed by rot before the remaining portions are eaten. There is also a tendency for the sheep to tire of the dirty roots towards the latter part of the grazing.

The field should be fenced in breaks and where more than one class of sheep is grazed the lambs or failing-mouthed sheep can be grazed on the tops of the first break, then moved on to another break while sound-mouthed sheep follow on and clean up the bulbs. After the bulk of the roots are reduced to ground level the shells that remain can be grubbed or skim ploughed and harrowed to make them easier of access. These shells are readily eaten by old failing-mouthed or "gummy" ewes. Of course if the field has been grassed down this latter cultivation will not be possible. In this case the sheep should be shut off the break as soon as the bulbs have been eaten in order to give the grass a good chance to establish.

Insect Pests

Insects causing the most damage to the turnip crop are the brown beetle—the adult form of the common grass grub *Odontria zealandica*—the white butterfly (*Pieris rapae*) and the diamond-backed moth (*Plutella maculipennis*). The brown beetle is often very severe on a turnip crop, as it attacks just as the young turnip plants are coming through the ground and while still in the soft seed-leaf stage. The effect of the attack can be minimised as mentioned earlier if steps are taken to sow the crop at a date that will allow the seedlings to be well advanced into the rough-leaf stage before the heaviest flight of the beetle. This usually commences about the middle of November and continues until the middle of December. After the flight is over sowing can again be carried on. Of course no definite date can be set down for this infestation, the time varying from district to district. Seasonal conditions also need to be taken into consideration, but if the farmer observes the time of heaviest attack over a period of years, losses from this cause can be reduced to a minimum.

The white butterfly and the diamond-backed moth both attack the

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Protection Today — Progress Tomorrow

plants, often severely, and at times as long as there are any leaves on which their larvae or caterpillars may feed. Serious losses are caused by these attacks each year, for naturally if a plant is not allowed to grow good leaves it has very little chance of growing good bulbs. Fortunately a parasite has been introduced to attack the chrysalid of the butterfly, and although not able completely to wipe out the pest it has definitely proved very successful as a controlling factor. From 80 per cent. to 90 per cent. parasitism of the chrysalid has been found to be quite common.

Two kinds of parasite have been liberated against the diamond-backed moth, one to attack the caterpillar and one the chrysalid. Both are well established, though perhaps not yet widespread throughout the country. There is no doubt that they will play some part in reducing the moth pest, but whether they will give economic control remains to be seen.

Disease

The two most important diseases to which turnips are subject are dry rot and club root. Dry rot is chiefly a seed-borne disease, but infection may be carried over in diseased roots remaining in the ground from a previous crop. The disease is first noticed as ash-coloured circular patches on the

leaves, but as the plant develops the infection spreads to the roots, producing grey softened patches which gradually spread throughout the bulb, until late in the winter when the whole root becomes a dry, spongy mass. Wet rot often develops on this material as a secondary infection. Most fields probably contain a proportion of plants so affected, but in low-rainfall areas the disease develops relatively slowly. In the wetter areas, however, the development and spread through the crop are much more rapid. As the spores of the fungus are carried about the field by insects or implements, the attack becomes even more widespread. Sowing clean seed on clean land is the best method of control.

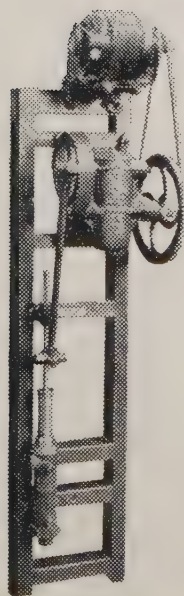
Club root disease is well enough known to require little description. The unsightly knobby swellings on the roots are easily recognised by all growers of turnips, rape or cabbages. Here again the complaint is uncommon in the drier districts. It occurs chiefly on the wetter ground of the foothills, and has been known to cause severe losses on young or even well-grown crops of turnips. The spores can live in the ground for five or six years and are readily carried from place to place on the feet of animals or man. Roots from an infected crop should never be carted into a field in which it is intended to sow turnips or rape within several years.

Where attack may be expected the best treatment to discourage club root is to apply up to two tons of lime to the ground three months before sowing. Never sow two successive brassica crops in the same paddock and where possible restrict the movement of stock between an affected crop and a clean paddock. In these areas it is also highly advisable to sow one of the resistant varieties already mentioned. Although it may not be possible to achieve 100 per cent. results on affected areas, it is possible, by using the measures outlined, to reduce losses due to club root.

Over 65,000 electric motors are in use on New Zealand farms, and an insight into factors concerning their operation and maintenance is contained in Bulletin No. 204, "Electric Motors on the Farm," which is available free from offices of the Department of Agriculture.

Among the 5000-odd varieties of grapes there are some that will ripen in almost any sunny spot in New Zealand. "Vines for Home Gardens," Bulletin No. 164, available free from offices of the Department of Agriculture, shows that grapes can be grown in any garden which has a well-drained soil and receives plenty of sunshine.

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RURAL HOUSING

Accommodation for Farm Workers

Farmers are aware of the vital need for food production as New Zealand's contribution towards the common cause of the United Nations. This need is immediate and will continue into the post-war years. The Government has made additional labour available for this purpose, and the National Service Department, working with Local Primary Production Councils, has already issued instructions as to the method of applying for any extra help which may be required.

TEMPORARY ACCOMMODATION.

SURPLUS Army buildings are being made available to meet the needs of farmers who wish to employ additional men where the conditions do not warrant the erection of permanent accommodation. They may be hired or (in the case of the single men's hutments only) purchased outright on the terms shown below. All the work necessary to erect them on farms will be carried out by the

Temporary or permanent housing may be necessary to enable you to accommodate your employees. If so, please read this article carefully. It explains the emergency scheme which has been prepared for the housing of farm workers.

Housing Construction Department. The buildings are supplied to the farmer complete and ready for occupation.

Types Available

Type "A": An Army hutment, 10ft. x 8ft., with heating stove and, where necessary, rain-water tank. This type is suitable for one single man.

Type "B": An Army hutment, 20ft. x 8ft., with heating stove and, where necessary, rain-water tank. This is suitable for two single men.

Type "C": Married man's temporary quarters, 40ft. x 8ft., comprising bedroom, livingroom-kitchen, and combined laundry-bathroom. This is equipped with cooking stove, sink and bench, copper, tubs, and bath, and, where necessary, rain-water tank.

Terms of Hiring

(a) The term of hire will be the period during which the farmer requires the additional labour, with a minimum of three years and six months.

(b) The rentals payable are: Type "A" 25/- per quarter; Type "B" £2 per quarter; Type "C" £5 per quarter—all payable quarterly in advance.

(c) Subject to approval of the application as explained below, the farmer will be required to sign an Agreement of Hire and to pay the first quarter's rent prior to delivery and erection of the hutments.

Terms of Purchase

(a) Hutments of types "A" and "B" may, if desired, be purchased outright, either for cash or on terms, at the following prices: Type "A" £40; Type "B" £60. Temporary quarters of type "C" are not available for purchase.

(b) Terms: The purchase money may, if desired, be paid by a deposit of 20 per cent. and four equal quarterly payments thereafter. If payment in full is made within 12 months of the date of delivery, a discount of 5 per cent. of the purchase money will be allowed, while for payment in full

prior to delivery the discount is 10 per cent.

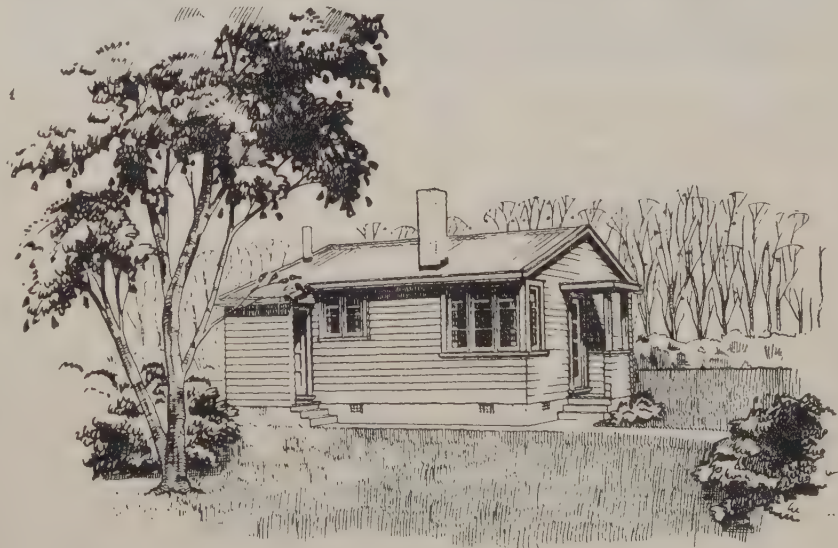
PERMANENT ACCOMMODATION.

Two standard designs of permanent houses have been prepared as follows:

Type "D": Comprising two bedrooms; livingroom, kitchen; laundry and bathroom. The cash price for this is £980.

Type "E": A smaller unit comprising two bedrooms; combined kitchen-livingroom, also laundry and bathroom. The price for this is £750. A detached E.C. is supplied with each type and provision is made for two 600-gallon rain-water tanks, unless domestic water supply is available, in which case the tanks will be omitted and a W.C. and septic tank will be supplied. The cost includes electric light installation, but does not allow for service mains to be connected a greater distance than one chain. Fuel ranges only will be provided with a 30-gallon hotwater cylinder attached. The price does not include footpaths or fencing of any description. All the work of erection and fitting will be carried out by the Housing Construction Department.

The site must be approved by the Housing Construction Department and should have reasonable access to a formed road or driveway. Any additional roading necessary to provide the contractors with access will re-



PERSPECTIVE OF MINIMUM RURAL HOUSE: TYPE "E."

quire to be paid for by the farmer, also excessive excavation costs.

Good classes of timber and a good standard of finish are called for in the plans and specifications. All flooring and the sub-structure are specified of heart timbers. Linings and ceilings are of wallboard, which are to be finished with paint. Chimneys are specified to be reinforced precast concrete, and the roof of corrugated fibrolite.

The usual fittings to be found in today's modern home are included. The plans are designed so that an additional room or rooms can be added when desired at a later date where shown, involving only minor alterations to the original building. Certain fittings are available ex military camps, and these will be used in lieu of purchasing new equipment.

Method of Finance

Permanent accommodation of this type may, if desired, be purchased for cash. If, however, you are unable to pay the full amount or to arrange the necessary finance from your existing mortgagee, the Government, through the State Advances Corporation, will provide finance in appropriate cases to enable you to meet the cost. If the loan is agreed to, security will be taken by way of a charge under the Farmers Loans Emergency Regulations 1940, but if there is already a mortgage on the property the charge to the Corporation will rank proportionately with the first mortgage. The term of the loan will be for 15 to 25 years, as may be decided by the Corporation, over which period the principal will

be repayable with interest at 4½ per cent.

This method of finance has been adopted as an emergency measure in view of the urgency of providing adequate housing to permit the immediate employment of additional labour.

How to Proceed

All applications for the above types of accommodation are subject to the approval of your local Primary Production Council.

A form of application is obtainable from your Primary Production Council, your dairy company, or the State Advances Corporation, and should be completed by you and forwarded to the Secretary of the Council. The type of accommodation desired should be clearly shown. On the decision of the Primary Production Council being obtained, the State Advances Corporation will advise you further as to the steps to be taken.

Important

As already mentioned, the erection of both the temporary and permanent types of accommodation will be carried out by the Housing Construction Department, and it is imperative that information be had at the earliest possible date of the amount of accommodation that will be required so that the necessary arrangements in regard to labour and material may be made immediately.

The above offers in regard to hutments and the permanent types of house can therefore remain open for only a limited period, and applications cannot be accepted after November 30 next. If accommodation is required, the farmer should, in his own interest, make immediate application to his Primary Production Council.

ACQUISITION OF CAMP BUILDINGS.

(a) 10ft. x 8ft. and 20ft. x 8ft. Hutments. Some farmers may wish to acquire these hutments as they stand and make their own arrangements for transportation to and fitting up on the farm. In this event they may be purchased from the War Assets Realisation Board at the following prices: Type "A" £25; Type "B" £50. These prices are for hutments in first-class order and are subject to reduction according to condition. The sale price may be paid quarterly or in one sum on the same terms as apply to the completed accommodation. Enquiries in respect of unfitted huts should be addressed to the Secretary of the War Assets Realisation Board, Wellington, or the District Storekeepers, P.W.D., Auckland or Christchurch.

(b) Shed Accommodation for General Purposes: The War Assets Realisation Board has for disposal a num-

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ber and variety of military camp buildings suitable for farm sheds. Inquiries in respect to this class of building should be addressed to the Secretary of the Board, or the District Storekeepers as above, who will supply details of the types of buildings available, together with their cost. This class of building does not comprise a part of the present housing scheme, and the above information is submitted to advise farmers of the facility which is offered in respect to this class of building.

What Your Cream Slip Means

How to work out amount of butterfat supplied to factory from details on cream slip: The cream slip returned by the factory each day, and a copy of which is sent on a 10-day period sheet, gives details of the net weight of cream supplied and the grade. On the 10-day sheet the average test for that 10-day period is given at the bottom. By totalling up the amount of cream for each day, say you get a total of 1954 lb. for the 10-day period, with an average test of 38. This means that 100 lb. of cream contains 38 lb. of butterfat. Thus the total amount of butterfat supplied for the period

$$= 38 \times \frac{1954}{100} = 742.5 \text{ lb.}$$

PAMPAS GRASS.

A timely and comprehensive outline of the main points governing the successful development of a pampas grass plantation is given in Bulletin No. 215, "Pampas Grass," which is available free from offices of the Department of Agriculture. Interest in pampas grass as a supplementary fodder for cattle has been steadily growing, and this pamphlet, arranged in the form of question and answer, should meet all problems likely to face those contemplating establishing a plantation.

VITE-ADEE

DOUBLE-STRENGTH

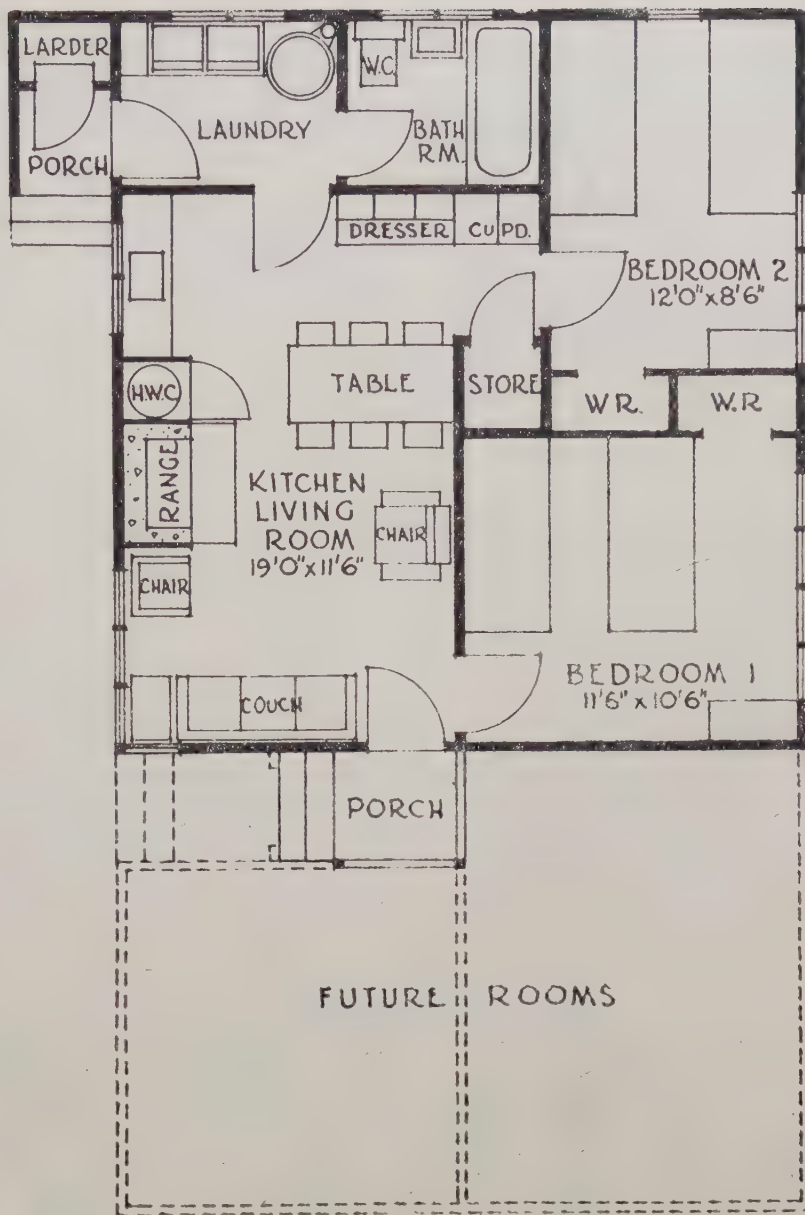
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MODERN PIGGERIES.

Plans and specifications of houses and layouts actually in use in New Zealand are available in the Department's free bulletin, "Layout and Construction of Modern Piggeries." Copies may be obtained from the Department of Agriculture, Auckland, Wellington, Christchurch, or Dunedin.

"The Citrus-growing Industry: How to Establish an Orchard," Bulletin 206, is available free from offices of the Department of Agriculture.

MAGNESIUM DEFICIENCY OF APPLE TREES.

A magnesium deficiency of apple trees in the Nelson district was recently reported, and it was found that injections of magnesium sulphate were effective in preventing the appearance of the symptoms. A free bulletin on "The Value of Magnesium Compounds for the Control of Magnesium Deficiency of Apple Trees" is now available from the Department of Scientific and Industrial Research.

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Veterinary Notes for the Farmer

Care of the In-foal Mare

IN the districts where the breeding of heavy horses is still carried on mares will be foaling, or due to foal, in the course of the next few weeks. The care of the in-foal mare is of some importance so that a well-developed healthy foal may be produced. In the case of the young mare broken to work it is probably a better practice to feed reasonably well and carry on with a reasonable amount of work right through to within a few days of foaling. Slow chain work is quite suitable, but sudden heavy draughts or jars, together with dray work, are to be avoided. A mare in fit muscular condition as foaling time approaches will have less difficulty at foaling than mares in soft, overfat condition. The mare in poor condition is liable to suffer from swollen legs, oedema, and dropsy of the udder and tendon in front of the udder. Occasionally rupture of this tendon is seen in aged mares in poor condition.

If the mare has been working and has been on hard feed during the spring months, the change on to grass for a few days before foaling date will have a most beneficial effect. The change of feed ensures a laxative condition of the bowels, tends to flush the udder and the milk supply for the young foal, and brings about a relaxation of muscles and ligaments and an easy foaling. Moreover, if the mare is on a clean, fresh paddock she can be safely left there until foaling takes place.

Unless some abnormal presentation calls for assistance at the time of foaling, the usual time taken by the mare at foaling is short, and apart from observation it is best to leave the animal alone. If the arrival of the foal is delayed and assistance is called for, the matter should be attended to promptly, as the mare will soon become exhausted through her own efforts.

Normally the membranes are expelled within an hour after birth, and no further trouble should be experienced. Retention of the membranes in the mare is more dangerous than in the cow, mainly on account of the absorption of toxins, bringing about the condition known as laminitis and commonly spoken of as "founder."

The foal at birth generally requires little attention, although owners usually take the precaution of ligaturing the navel cord with silk or cotton

soaked in iodine solution. This safeguard against navel infection and the disease of navel-ill or joint-ill in foals is very necessary on some farms where horse breeding has been carried on for some years. For the first few days it will be sufficient to observe that the mare has plenty of milk in the udder, that the foal is able to suckle the mother, and that the foal is bright, active, and functioning normally. Any tendency to constipation in the foal may be relieved by a dose of a few ounces of castor oil.

Probably the most dreaded disease of the young foal is that known as navel-ill, an infection which gains entrance and settles in the joints, bringing about enlarged joints, lameness, and general fever and constitutional upset. Should an owner suspect the onset of the disease, he is advised to consult his veterinary surgeon as soon as possible, as there are good prospects of treatment with modern drugs. In the early stages the affected foal is inclined to lie about and refuse to suckle. If the foal is forced to get up

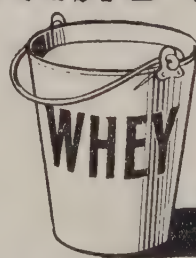
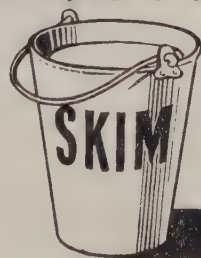
and move along, it will show a tucked-up appearance, and may be decidedly lame on a fore or hind limb, or both. If a closer examination is made, the knee, hock, or stifle joints may be found to be enlarged and painful. The navel may or may not show anything suggestive; it may have dried up and appear to be healthy. As already stated, veterinary advice in regard to medicinal treatment should be sought as soon as possible.

The Stallions Act

In connection with the breeding of heavy horses it appears opportune to draw the attention of owners of heavy breeds of stallions to the provisions of the Stallions Act, 1938. Owing to the preponderance of the Clydesdale breed as the draught horse of the Dominion, the Act will apply in the main to owners of Clydesdale stallions.

Some owners may not be aware of the provisions of the Act, which came into force on April 1, 1939. At the time the Act was introduced it was necessary in an endeavour to raise the standard of soundness of horses to provide for the licensing of stallions intended to be used for general breed-

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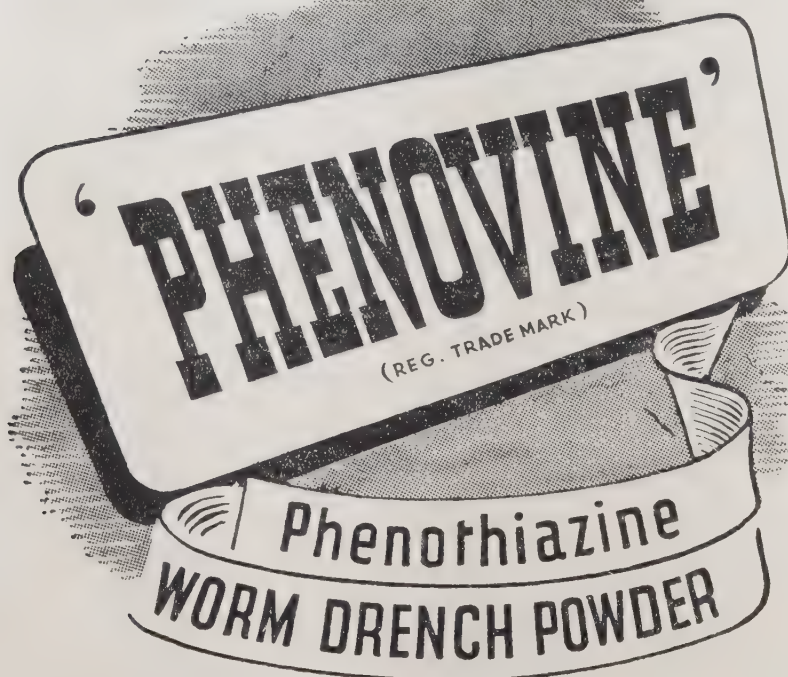
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ing purposes. In the 1939 season only two-year stallions were required to be licensed, older horses being exempt, although there was provision for a veterinary examination and for the issue of a certificate of soundness to the owner of any stallion who might desire it.

With the lapse of time it now becomes necessary for the owners of all Clydesdale stallions within the ages of two and seven years to have them examined and licensed for the present breeding season. This applies to all stallions to be used for service for fees, and any owner who uses a stallion for fees without first obtaining a licence commits an offence under the Act.

Licensing of stallions is not necessary where owners use them for the service of their own mares.

Owners of stallions who require licences should make application to the Registrar on the prescribed form, which may be obtained from offices of the Department of Agriculture or from the Secretary of the Clydesdale Horse Society, Hawera. Each application should be accompanied by the necessary fees.

Answers to Correspondents

Feeding Calves Without Milk

"J.W.," Heriot:—

I would be obliged if you could tell me through your "Journal of Agriculture" how to feed calves without milk. I have a calf here which is three months old, and as I do not want to make her a small beast when she gets older, I wonder if you could help me. How old do calves have to be before you can wean them and turn them out with other cattle?

LIVESTOCK DIVISION:—

I presume that up to the time of writing you have been feeding your three-months-old calf on whole or skim milk without grain concentrates. It is possible to rear calves on small quantities of milk plus grain supplements. This method of rearing should be practised only when milk is in short supply, as quite apart from the disadvantages of going off the natural food, the cost of grain feeding is higher than feeding on milk and milk products, and also entails more work. In cases where milk is in short supply calves can be successfully reared by milk feeding for four or five weeks, and then gradually weaning the calf, and substituting for the milk a suitable grain mixture. A suitable mixture would consist of 25lb. crushed barley, 40lb. crushed oats, 12lb. bran, 20lb. pea meal, 10lb. linseed meal, 12lb. meat-meal, with mineral mixture added at the rate of 3lb. per 100lb. of grain mixture. However, in your case, in which

THE thorough paring of affected feet, which is so essential in treating foot-rot, will be more easily carried out, particularly when working single-handed, if a chair similar to the one illustrated is used. This chair is in use on the farm of Mr. L. Baker, Risington, Hawke's Bay. It can be simply constructed from old timber (3 x 2 or 3 x 4½) and sacking. The sheep is secured by a leather strap across the neck, fixed on one side of the frame and fitting on to a hook on the other.



Rough dimensions for use with Romneys are:—

Base: 2 ft. 6 in. long, 1 ft. 6 in. across.

Uprights: 1 ft. 8 in. high.

The sacking "bed" should, of course, be sufficiently long and broad to dip, forming a trough into which the back of the sheep fits.

—A. D. M. G. LAING,
Veterinarian, Hastings.

you have only one calf to feed, this mixture may be rather complex. The following is a more easily made grain supplement, and should be suitable for your requirements:—

Crushed oats, 6 parts.

Bran, 2 parts.

Linseed meal, 2 parts.

Meat-meal, 2 parts.

A three-months-old calf should receive from 2 to 3lb. per day of this mixture, the amount being gradually increased until the calf is receiving 6lb. per day at 6 months. Substituting grain for milk should be a gradual process, even in a calf of three months, and I would suggest that you continue feeding milk in decreasing amounts for a few weeks to allow the calf's digestive system to become accustomed to the changed ration. When calves are being reared without milk it is important that they have access to good grazing and ample good-quality hay. To answer your second inquiry in reference to the age at which calves should be weaned: Under normal circumstances they should be fed whole milk or milk products until they are six months old. They may be weaned at this stage provided good grazing and hay are available. If good grazing is not procurable, some supplementary

grain feeding is desirable after weaning. Many calves are weaned under six months, but to obtain the best results from them when the calves finally come to production it is necessary to feed them for at least this period.

Terms Lamb and Hogget

"J.G.H." (Waihi):—

I am a beginner at sheep-farming, so would you oblige by giving me answers to the following questions:—

1. What age is a hogget (or, in other words, when does a lamb become a hogget)?

2. Is it correct to call a hogget a two-tooth hogget?

3. What age is a two-tooth?

LIVESTOCK DIVISION:—

The terms lamb and hogget are used quite loosely, depending upon whether either term is used by a farmer, a stock-buyer, or by a butcher. The term lamb is used for the young animal from birth up to the end of the first year, until the next crop of lambs comes along to take its place. In this



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Carbon Tetrachloride Drench and

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Nicotine Bluestone and Cobalt Drench.

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category there are several subdivisions and terms to describe lambs; thus we have early spring lambs, milk-fed lambs fat off the mother, weaned lambs, rape-fed lambs, and carry-over lambs. The latter lambs from March onwards, intended to be wintered, either for replacements to the ewe flock or to be carried on and fattened as wethers, are frequently described by farmers and graziers as hoggets, and are described as ewe hoggets or wether hoggets. Strictly speaking they are all still lambs at this age. Right up to the age of 12 months the lamb shows no broad or permanent teeth, only milk teeth being present in the gum.

The hogget has been described from the butcher's point of view as an animal showing not more than two permanent incisor teeth. These two teeth are normally expected to be showing through the gum at 15 months, and to be up and in full wear at 18 months. Thus a two-tooth hogget, quite a correct term, implies an animal about 15 to 18 months, or even a little more. The next pair of incisor teeth is expected to appear at about 21 months, and to be in full wear at 24 months. Thus, from the butcher's point of view, the young hogget mutton which is in demand as being more tender than older mutton is from the two-tooth age group.

Again it is not rare to hear stockmen speak of four-tooth hoggets or even six-tooth hoggets. It would be better to refer to these latter animals according to their age as two-year-old, three-year-old, full mouths, etc.

Loose Swelling Under Heifers' Jaws

"H.S.", Kaukapakapa:

I have about 20 rising three-year Hereford heifers running on good limestone country which has not been top-dressed. The heifers are in nice, healthy condition, but I noticed lately that several of them have a loose swelling under the jaw. A number of them had the same swelling last year, but I did not worry much then, as I was very short of feed and they were very poor. Could you tell me what the trouble might be and what I could do for it. Do you think a mineral lick would help? If so, what would you suggest?

LIVESTOCK DIVISION:

The swelling described in the animals is not likely to be strictly a diseased condition, unless further symptoms, such as dribbling at the mouth or loss of condition, become evident. A loose swelling below the jaw as indicated is evidence of a dropsical condition quite frequently seen in all grazing animals at this time of the year. It naturally becomes more pronounced in animals on short feed or in poor condition; hence its appearance last winter, when the animals were poor.

Being three years old this winter, it is presumed that the animals are in good condition after the summer's feed. It is not likely that animals of this age will be affected with worms, although worms might have been present last year.

Whether any treatment should be carried out will depend largely on the condition of the animals. A severe

dropsical condition is evidence of anaemia or bloodlessness, whereas a slight swelling may be taken as normal at this season of the year. If you decide to provide a lick, it is suggested that a mixture of 80 lb. of salt with 20 lb. of limonite might prove quite useful. As you know, limonite is an iron oxide, which should assist in overcoming any anaemia which might be present. The cattle are running on limestone country so other minerals are not likely to be in short supply.

Cow with "Lumpy Jaw"

"W.H.K." (New Plymouth):—

I have here a moderately valuable cow (first calver) which developed a swelling underneath the jaw a few days ago. It is fairly hard, but does not seem to increase. The cow has gone "off her feed" and correspondingly gives much less milk, although she does graze and chew her cud. Do you think this can be "lumpy jaw," or a hurt? If lumpy jaw, Maynard says potassium iodide will cure; but it is very expensive and he prefers lancing. If this is required, do you think the operation could be performed by myself? The cow does not act as if ill, and her eyes are bright.

LIVESTOCK DIVISION:—

From description and the fact that the animal is a first calver there is little doubt that your cow is affected with what is commonly known as "wooden tongue" or "lumpy jaw." This is an infection caused by a specific type of organism, and lancing the hard swelling will not be effective in bringing about recovery.

As potassium iodide has proved very valuable in the treatment of these cases, I would suggest you contact your nearest Inspector of Stock, who will arrange to inspect the animal and outline a course of potassium iodide treatment. Should the animal be slow to respond to the iodide treatment, the inspector will follow up the progress of the treatment.

As the cow is going off her feed, it is apparent that the tongue is already considerably enlarged, and the sooner treatment is carried out the better. The drop in milk yield naturally follows as the animal is suffering from the disability of being unable to feed and ruminate properly.

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the
Healthier*



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The soundest advice JOSEPH FORD can offer farmers is . . . "Take nothing for granted . . . protect against scour and unthriftiness and improve the general health and condition of your stock . . . use JOSEPH FORD'S COBALT DRENCH . . . **starving is not necessary** . . . and it can be given with perfect safety to ewes and lambs of any age or condition."

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LUCERNE for HAY



Lucerne should be a standard forage crop in those districts where the soil and climate are suitable.

1. Lucerne provides heavy crops of excellent hay and valuable green fodder in the summer.
2. Lucerne resists drought.
3. Inoculate the seed before sowing. Order your inoculation now, advising approximate date of sowing.
4. Sow lucerne on a sweet, clean, fine, and firm seed-bed.

Lucerne

Lucerne is growing slowly but steadily in popularity in New Zealand in districts where soil and climate suit its growth. Since 1927 the area of lucerne cut for hay or silage has increased over 50 per cent. This is easily accounted for by its high yield of nutritive fodder.

BEING a clover, lucerne is high in protein and is therefore of great value for feeding to stock at times when pasture growth is low. Unfortunately the plant does not take kindly to grazing and most of the lucerne in the Dominion is used for cutting for greenfeed and hay and silage. Its use therefore is generally limited to the needs of the farm for supplies of such feeds in a normal year, and on soils and in climates which suit it it should be the aim of the farmer to grow a sufficient acreage for that purpose.

Drought Resisting

Lucerne, because of its drought-resisting qualities, is of particular value in districts where the summer rainfall is fairly low. On dairy farms in such climates it is of particular value for supplying protein-rich food from January to August to balance supplementary fodders such as greenfeeds and roots fed to the cows. On sheep farms in dry climates it may be utilised for light grazing in summer at times and for hay for winter feeding to balance roots.

In moist climates it is used for providing hay and silage and for cut greenfeed for feeding to cattle in the dry-weather period. There the first cut, usually ready in November, is made into silage and subsequent cuts into hay or fed green if the pastures become dried up.

Lucerne is grown chiefly on the light volcanic soils of Auckland and on the alluvial soils in the drier areas of the East Coast of the North Island and in the South Island.

Establishment

November is the generally-accepted month for lucerne establishment. Like all clovers and root crops it requires a fine and firm seed-bed, and it is noticeable that establishment is best on the tramped headlands and near the gate entrances of fields. Rolling before and after sowing is therefore of

great importance, particularly on light soils. Repeated harrowings prior to sowing are also required to obtain a fine and firm seed-bed and to destroy annual weeds.

Lucerne requires ample supplies of lime and phosphate and it is usual to apply 10cwt. to 1 ton per acre of lime before sowing, and it is advisable to sow heavy amounts on soils deficient in lime. In areas suited to lucerne culture the most suitable fertiliser for application at time of sowing is basic super, either super reverted with lime, or serpentine. Straight super or any fertiliser which will affect germination or destroy the inoculating bacteria should not be applied with the seed. The inoculating material supplied by the Plant Diseases Division, Scientific and Industrial Research Department, Auckland, will keep for two or three weeks and should be purchased so that it is available about the time of sowing seed. Inoculation costs little and should always be carried out in sowing new areas.

Little Troubled by Weeds

In the early stages lucerne does not develop much growth above ground and is therefore subject to smother by fast-growing annual weeds such as fat-hen. After the first cut, however, the lucerne, with its power of greater recovery, soon outdistances the annual weeds, which thereafter cause little trouble.

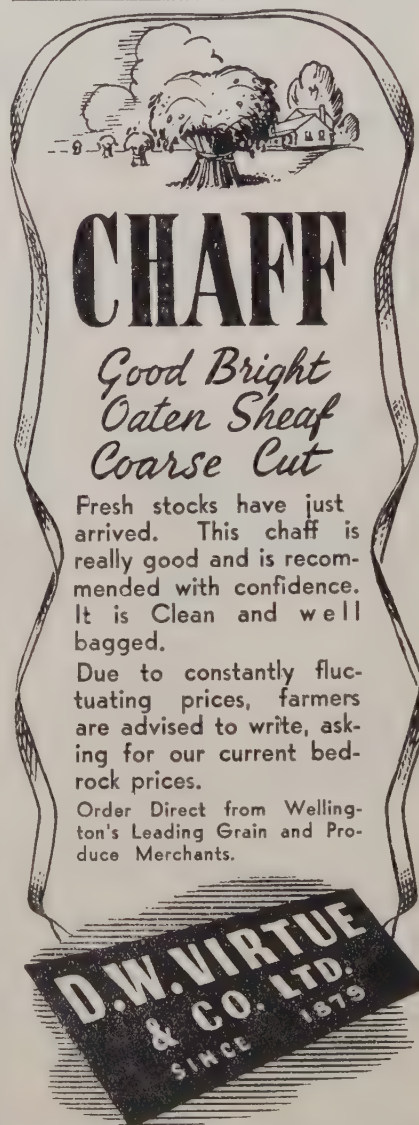
The life of the stand is largely determined by the vigour of the lucerne. If it is vigorous it will withstand competition from almost any kinds of weeds. Every year weed invasion of one kind or another sets in during the winter months, for during this period the lucerne is dormant. The weed invasion is greatest where winters are mild and moist. The worst weeds are usually grasses, and *Poa pratensis*, a twitch, commonly asserts itself in lucerne stands. Flat weeds, such as ribgrass, are also common in weak stands. The first cut of lucerne, usually comprising grass weeds and lucerne, makes good silage.

Weed invasion may be checked first by keeping the stand vigorous and assistance may be given by cultivating the soil soon after cutting. The most opportune time for this is usually after the first cut, for the soil then is fairly moist and is reasonably easy to cultivate, the best implements for this work being grass harrows or cultivators suited to penetration of hard

ground. If the stand's vigour is maintained, however, there is little need for concern regarding the weeds, which will suffer during the spring and summer owing to the smothering effect of the strong growth of the lucerne and the frequent cutting. If a tilth is obtained after the last cut in the autumn and oats are sown, these will not only provide green fodder for the late winter or early spring but will also prevent winter establishment of weeds.

Time to Cut

The recognised time for cutting lucerne for hay or silage is when the



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crop is in flower and new shoots at the base of the plant are showing. There must be room for compromise, however, when the crop or part of the crop is required for green fodder, when for the first cut, at least, a portion of the crop must be cut earlier or later than the flowering stage. The greatest care must be exercised in curing the crop for hay, because probably more than any other hay crop the value lies in the leaves, which, with poor handling, are very liable to fall off. Lucerne hay with almost all the leaves intact and well conserved is an altogether different product to lucerne hay poorly saved and consisting largely of brittle stalks containing little sustenance. In the cock or in the stack rain penetrates easily into the lucerne and care must be taken to see that these are well

built, well raked, and, for large cocks or stacks, well covered.

Manifold Advantages

Lucerne gives very high yields of excellent hay and valuable green fodder. It is not a difficult crop to establish or grow, and would be exploited to a greater extent in this country were it not for the substantial production that can be obtained from our pastures. Nevertheless, in districts and on soils that suit its growth it should play—and judging from the steady increase in area of this crop it will play—a greater part in our agriculture.

Fortunately the lucerne stand is easier to maintain in the colder and drier areas, where it is more valuable owing to the greater need of green

fodder in the summer and a supply of protein-rich hay in the winter. In such areas it is invaluable on dairy farms and will be of considerable assistance to the sheep farmer. Lucerne, like pasture, is suited to irrigation, and in irrigated areas should be exploited to the full.

Rape, Chou Moellier and Soft Turnips

THESE crops belonging to the brassica family may be sown from now till Christmas. With rape it is better to sow at fortnightly intervals, with mustard strips sown here and there a fortnight after the first sowing to correct the digestive upset liable to occur among lambs when first introduced to rape. The crop takes 10-12 weeks to reach the blue stage when it is ready for feeding and sowings should be timed accordingly, allowing one acre for every 25 lambs to be fattened on country suited to the crop.

Chou moellier is increasing in popularity throughout the Dominion, replacing the swede crop, which is more susceptible to disease. Sown now the crop will be available for autumn feed, but is generally kept for feeding in the winter. Except in southern areas it is sown on the flat, and although not as capable of such high yields as the swede, it is more resistant to drought. It is a very nutritious fodder and is valuable for maintaining sheep or cattle in the winter.

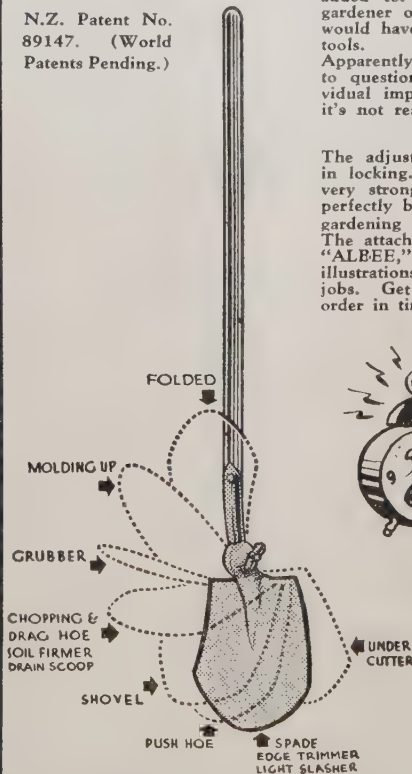
In the North Island the soft turnip crop is sown now for the production of summer feed for milking cows. It certainly has a marked effect on the supply of milk when fed to dairy cattle, and care needs to be taken to provide other feed such as green maize so that the condition of the cows is maintained.

It is best sown in breaks unless early and late varieties can be utilised so that an even supply of young turnips is ready for feeding. With age the turnip is liable to attack by bacteria, causing decay, and develops a strong flavour, which may contaminate the milk. Sown about Christmas in southern districts the soft turnip provides early winter feed before the swedes are ready or need be used. Sown in February in northern districts the soft turnip will provide feed throughout the winter. The yellow-fleshed varieties are better keepers, but are longer in coming to maturity.

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Please post me "The Awakening." I enclose P.N. (or Stamps) for 2/6; cheque for 3/-.

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J.A. 15/9/44

Silage

IN the earlier districts silage making will now be commencing and if an early start is made, the work need not be rushed, being carried out between milkings. Up to flowering our grasses are very nutritious, but shortly after flowering there is a rapid decline in nutritive value. This points to the value of making a considerable amount of silage, because thereby a greater area of the saved grass can be cut for silage and hay before the late stage is reached. Fields cut early for silage will also produce a good aftermath for feeding in the summer.

If a pit is available, there is no necessity, except on one-man farms, to provide extra labour to assist with the work, unless the farm is understaffed for normal work. Early-cut material is usually high in moisture, and cutting when the grass is wet should be avoided; the material is better slightly wilted, particularly when filling the bottom of the pit or

commencing the stack. A spell of a day or so is advisable after the first day's work, after which the stacking should continue from day to day.

On the other hand, when cutting mature, dry material it should not be allowed to wilt at all, and harvesting should proceed at a rapid pace, particularly towards the finish of the stack or filling of the pit, and the soil cover should be applied as soon as possible after completion.

Careless Stacking Wasteful

In building the stack make the sides perpendicular and at the finish heart the centre high and by use of bags of earth, logs, or other means bring the weight of the earth cover to bear as fully as possible on to the sides of the stack.

Care and attention in building and completing a stack of silage are well rewarded, or perhaps it would be better to say that care-

lessness in that direction results in much avoidable waste.

It is probable that the chief deterrent to the making of silage has been the poor results secured in the early years of silage making on many farms. Frequently the material was dry and coarse, cut late, and too much time has been taken in building. This resulted in dark brown, overheated silage, with much waste and musty material.

Simpler Matter Now

Now that the early difficulties in making silage have been solved and mechanisation has come more to the assistance of the farmer silage should assume a greater place in agriculture, particularly on our dairy farms. A few years ago the transport of the material to the pit or stack was a problem, because most of the equipment used for that purpose for hay was not suitable for silage. Now, with the tractor sweep on large farms and the smaller horse-drawn sweeps on the small ones, there is little difficulty.

Mangolds

THE mangold, which is the most important root crop in Europe for feeding to stock, has merits which should be fully considered before making final decisions in allocating areas to crops for feeding to stock next winter. It claims attention of farmers producing dairy products, mutton, beef, pig meat, or wool on account of its high yield per acre—probably higher in this respect than any other crop—and its excellent keeping qualities.

The mangold fails as a fodder because of its low content of protein. Therefore when fed to cows it will assist in maintaining condition, but is not productive of milk, which is secured from the grass consumed. If, however, cows on a ration of hay, mangolds, and a limited supply of grass are deprived of the roots, then the production of milk will fall, because the grass consumed will be required for maintenance purposes.

Mangolds are a useful fodder for all stock at the latter end of winter and in the early spring, because by then other crops have either been consumed or have decayed.

Weed Competition

The so-called mangold seed normally sown is really the fruit of the plant and contains usually three seeds. The real seed being very small the fruit

should be planted very shallow on a firm and fine seed-bed. The mangold seedling is slow in establishing, being at the mercy of fast-growing weeds. Consequently farmers who intend to grow this crop should pay attention to the article by Mr. Saxby which appeared in the August number of this Journal on the use of the blow-lamp in destroying weed seedlings on seed-beds before the crop appears above ground.

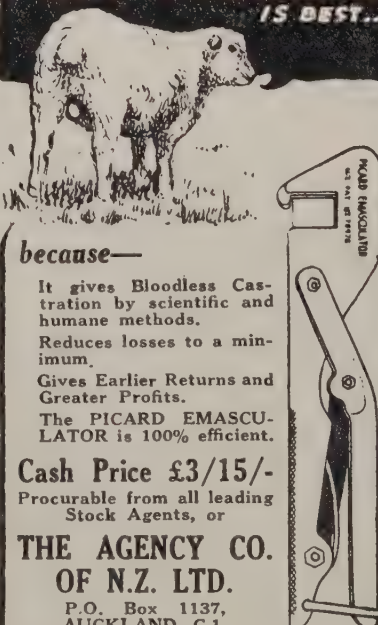
Normally the crop requires much attention during the early half of its growing period, for it is at the mercy of the faster-growing weeds and much hand work is required. Owing to the sowing of fruit instead of true seed, many of the young seedlings lie close together and frequently their stems are intertwined, causing much hand work in spacing the plants.

In cold climates and on heavy soils the seed should be sown on ridges, but in mild climates on light soils sowing on the flat is common practice. Sow the seed with super reverted with lime or serpentine. In northern districts where weed growth is very rapid the transplanting method should be adopted.

The variety of mangold used does not matter a great deal, since the higher-yielding ones are usually poorer in dry matter content, so that almost all varieties will produce about equal amounts of dry matter per acre.

The best crops are obtained on well-drained, fertile loams. Being very hardy, the mangold plant does not suffer much from disease and resists drought conditions better than other root crops.

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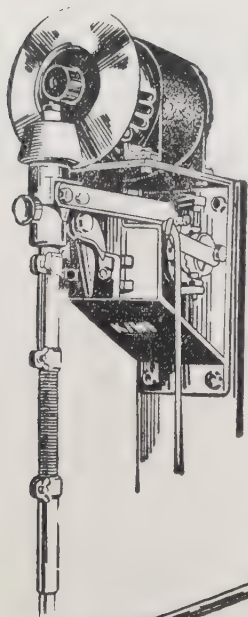


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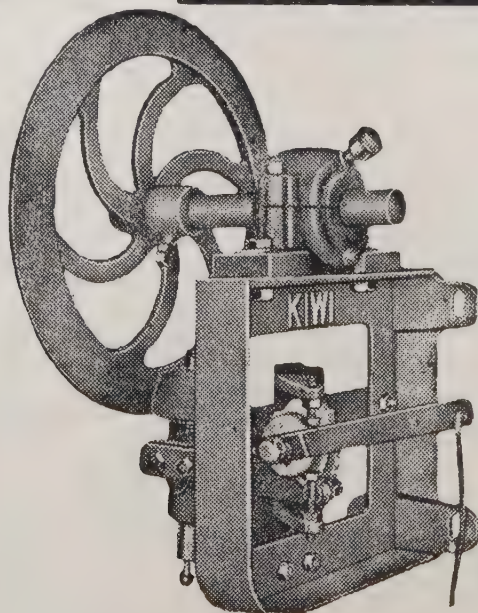
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Basic Maintenance Fodder

The mangold is so commonly grown in England that the term "roots" usually signifies this crop, and hay and "roots" have always been the basic maintenance fodder for cattle in England. During the few years before the war cheap imported food had replaced "roots" to a large extent, but by now "roots" will have resumed their past important position. In New Zealand, also, mangolds have their part to play, and it is to be hoped that all farmers who can make use of them will do so.

Carrots

THE carrot crop, with its high content of sugar and high palatability, is a popular market garden vegetable, and is also suitable for feeding to cattle and pigs. Except for such varieties as the Guerande, it is not suitable for feeding to sheep, owing to its habit of growing the edible portion of its rooting system to a large extent below the ground. The white varieties, White Belgian or Matchless White, are the heaviest yielding, but are not as high in feeding value as the Red Guerande or Long Orange.

The White Belgian stands well above the ground, whilst Matchless White has a broad top with shallow roots.

Sown now the crop will be ready for feeding next autumn, and since the crop keeps well it can be utilised from then on throughout the winter. Its use as a crop for feeding to cattle has declined, but it should be used more for this purpose on soils suited to the crop and, in particular, for the provision of nutritious palatable food for wintering pigs.

For high yield the crop should be sown in rows 14in. apart and inter-cultivated by hand. For large areas wider spacing to permit of horse hoeing is necessary. Once the crop is through the ground it should be weeded and before long thinned. If the weeds are kept well under control in the early stages, a good crop is assured. Sow only an area of ground which can be kept well weeded. This applies to both carrots and mangolds.

Slaughterings of Stock

THE following returns of slaughterings of stock at meat export slaughterhouses and abattoirs for the four months, May-August, 1944, have been compiled by the Livestock Division:—

District.	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Pigs
North Island.						
Meat-export Slaughterhouses—						
Auckland	84,532	327,069	101,269	56,768	165,724	72,778
Poverty Bay-Hawke's Bay ..	29,349	21,944	211,628	114,654	252,886	9,180
Taranaki-Manawatu	41,349	113,228	89,960	56,605	217,557	36,177
Wairarapa-Wellington	15,963	8,594	87,067	42,139	152,170	8,150
Totals	171,193	470,835	489,924	270,166	788,337	126,285
Abattoirs	41,616	11,807	188,954	62,761	28,590	14,204
North Island Totals ..	212,809	482,642	678,878	332,927	816,927	140,489
South Island.						
Meat-export Slaughterhouses—						
Nelson-Marlborough	1,122	2,829	7,435	5,243	49,247	4,237
Canterbury	5,764	9,115	170,417	154,216	590,604	11,104
Otago-Southland	7,316	1,182	146,616	133,590	723,235	1,919
Totals	14,202	13,126	324,468	293,049	1,363,086	17,260
Abattoirs	18,487	8,122	86,488	51,034	11,244	4,325
South Island Totals ..	32,689	16,248	410,956	344,083	1,374,330	21,585
Dominion.						
Meat-expt. Slaughterhouses	185,395	483,961	814,392	563,215	2,151,423	143,545
Abattoirs	60,103	14,929	275,442	113,795	39,834	18,529
Grand Totals	245,498	498,890	1,089,834	677,010	2,191,257	162,074
Same Period, 1943—						
Meat-export Slaughterhouses and Abattoirs ..	267,266	570,518	757,193	426,646	1,525,054	96,255
Same Period, 1942—						
Meat-export Slaughterhouses and Abattoirs ..	309,912	543,668	690,691	387,020	1,403,554	156,642

Slaughterings of Pigs

The 8,932 pigs slaughtered at meat-works and abattoirs during the month of August were distributed in weight-ranges, approximately, as follows:—

Up to 60 lb.	24
61 to 120 lb.	2,080
121 to 160 lb.	4,261
161 to 175 lb.	1,471
176 to 185 lb.	432
186 to 200 lb.	269
Over 200 lb.	395

8,932

The grading of porkers was 94 per cent. of first quality, and 6 per cent. of second quality; and that of baconers was 85 per cent. prime 1's, 10 per cent. of prime 2's, and 5 per cent. of 2nd. quality.

In the different weight-ranges the grading was as follows:—

	Prime 1's.	Prime 2's.	Seconds.
121-160 lb.	88 per cent.	8 per cent.	4 per cent.
161-175 lb.	82 per cent.	13 per cent.	5 per cent.
176-185 lb.	75 per cent.	19 per cent.	6 per cent.
186-200 lb.	69 per cent.	19 per cent.	12 per cent.

Cultivation for Spring-sown Crops

THE ground should be dry enough this month to get on with the cultivation of the soil preparatory to sowing spring-sown fodder crops and lucerne. After the ploughed land has been broken down with discs and cultivators it will require frequent harrowings to germinate and destroy seedling weeds and consolidate the ground. It is desirable that a harrowing be given a few days after every fall of rain. It is much easier to destroy weeds in this manner than after the crop is sown, while at the same time the extra cultivation makes for a more even and better strike of the crop seed when ultimately it is sown.

— J. E. BELL, Acting
Land Utilisation
Officer, Wellington.

Two Common Pests

Two of the most common pests of cabbages, rape, turnips, chou moellier, etc., are the white butterfly and the diamond-backed moth. No doubt a good deal of confusion exists among the farming community in regard to the damage caused by the white butterfly and the diamond-backed moth, and injury caused by the latter insect is all too commonly blamed on the white butterfly. The fact that butterflies are seen over a crop is not sufficient evidence for attributing any injury to their presence, and the only way to determine the cause of the injury is to examine the crop.

The differences between the two insects and the type of injury they cause are described in a special bulletin issued free by the Department of Agriculture.

Stacking of Baled Hay

FOR many years, dating back even through centuries of farming practice, it has been the custom to conserve surplus supplies of grass in the form of hay for the feeding of livestock during periods of pasture and crop shortage. For just as long a period this practice has been fraught with a number of problems which the farmer has had to surmount if he wished to produce a high-quality article.

Essentials

In the first place he has had to provide excellent pastures containing a good balance of the better grasses and clovers. This is very essential, as it is only from the highest-quality pastures that the best hay can be made. Consequently, areas must be well sown, suitably manured, and wisely grazed, in order to build up swards that will produce hay crops of high excellence.

Secondly, the crops must be harvested at the right stage. If they are allowed to become over-mature, the proportion of nutritive material to indigestible fibre will fall. This point must be carefully watched. Likewise, the efficient curing in the field has to be given skilled attention in order to get the best results.

Finally, and it is with this point that I wish to deal, the stacking and protection from the weather must be given special care.

Stack Building

Too often an otherwise good article is completely ruined by inefficient storage. Where stacks are built from loose hay the work should be supervised by a person who is skilled in stack building. Especially should attention be paid to such features as the hearting up of the material, the building of sides, spreading of material evenly, raking down of sides, and the topping off and covering of the stack. Only actual experience can lead to proficiency, so that is why the more experienced men should be on the stack.

In recent years, with the introduction of the field baler and more recently still of the pick-up baler, the use of baled hay has become more popular. Winter handling of hay is thus made much easier and results in a considerable saving in time at that period of the year.

Covering Baled Hay

Difficulties have arisen, however, in the stacking of baled hay. These, perhaps, would be better described as

problems in covering stacks rather than in building them.

The actual stacking of baled hay does not present any great problems. The main essential is to see that all outer exposed walls are tightly packed so as to prevent rain penetration. Each layer of bales must be stacked so as to "lock" the lower layers, so that the stack will not come apart. So far as the interior of the stack is concerned, it does not matter if there are odd small spaces. In fact these help to aerate the stack. With average care, then, a stack can be carried up quite well with no great experience in the work, the main points being to keep the outer walls tight and vertical.

Number of Methods

In covering there are a number of methods employed.

1. The farmer may build a tapering core of bales on top, and cap this with loose hay.

In general, the main weakness in this method is that insufficient loose hay can be built on to the stack to form a cap. Consequently heavy rains will penetrate and cause damage.

2. Directly on top of the last complete layer of bales a top, similar to the topping of a loose haystack, is built from loose hay. Provided this is well hearted, and given a little overhang for watershed, this method will give fairly efficient protection from the weather.

In both of these methods some means of keeping the hay in position should be employed. A strip of netting lengthwise along the ridge and well weighted would suffice.

3. There is another popular method where old iron is available. Over the last layer of bales some loose hay is placed so as to taper from that layer of bales on one side to a bale thickness on the other. Iron is then laid on this slope and weighted down.

4. Perhaps the most efficient method of all is that of using a totally enclosed shed where one is available, but few farmers are in a position to so store their baled hay. A modification of this, however, consists of the Dutch barn, or roofed open shed.

The Dutch Barn

In construction a Dutch barn consists of a roof supported by uprights. Usually the ends, from gables to the eaves, are boarded to give rigidity, and frequently a further board is provided along the sides just under

the eaves for the same purpose. Otherwise the sides and ends are open. Owing to the danger of damage from high winds it is advisable to build a Dutch barn in a fairly sheltered spot.

A building 12ft. wide, 12ft. high to the eaves, and 24ft. long will store approximately 600 bales of hay without building above the level of the eaves. These dimensions, however, may be varied in any direction to give greater or less capacity. Farm-grown saplings are frequently used for uprights. Such timber is quite efficient and would generally result in keeping down costs of building.

Whichever method happens to be employed, the measure of success attained will depend upon the efficiency with which the work of stack covering is performed. A good job can be done of topping up with hay, provided a good, tight stack has been built. Carelessness, however, will lead to rain penetration, which will be followed by high losses.

Where iron is used, either as loose sheets or in the form of a Dutch barn, the losses are considerably reduced, so that, where possible, this method of storage and covering should be adopted.

—C. WALKER, Instructor in Agriculture, Thames.

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In the Orchard and Vineyard

Orchard Notes

Value of Healthy Foliage

GOOD healthy foliage of all fruit trees is absolutely essential, and should be considered as a major factor in relation to crop production. A study of the botany of the fruit tree will show the important part the healthy leaf has to play in manufacturing food substances which are used up by the tree and the crop it produces. The function of the leaf is to elaborate, by means of energy obtained from the sun's rays, the soil solutes taken up by the roots, combined with certain gases from the air, into the food ultimately to be used by the living cells of the tree.

The process is complex and would require much space for detailed explanation, but the important factor is the realisation of how vitally necessary good healthy leaf surface is to the tree.

Among other factors, disease control is essential in maintaining healthy foliage. Fungous diseases such as leaf curl, black spot, and powdery mildew, which attack the leaves and interfere with their normal function, react to the detriment of the crop. Sap-sucking and chewing insect pests such as red mite, apple leaf hopper, pear slug, and leaf roller caterpillar cause serious debilitation of the foliage if left unchecked.

Necessary foods are normally produced in greater quantity than is required by the healthy tree; the excess, apart from that which is carried to the developing fruits or seeds, is stored by the tree until required. During the dormant season, mainly owing to the absence of leaves, food manufacturing does not occur, but reserve food storage is essential to carry the tree through its dormant period and enable the spring development of leaves and blossoms to continue. Any foliage damage therefore, whether by disease, spray injury, or any other cause, has far-reaching effects.

Other factors, such as adequate drainage, good cultivation, maintaining soil fertility by judicious applications of fertilisers, and ploughing in green crops to enable the essential plant nutrients to be available as required, are all as important in healthy foliage production as systematic and thorough spraying against diseases and pests.

Fruit Thinning Advantages

Although the actual operation of thinning a crop of pip or stone fruits may appear both expensive and tedious, its advantages are numerous, and ultimately prove profitable in the improved size attained by the remaining fruits and by the better market prices received for preferred sizes.

The tree itself will benefit by being relieved of the exhaustion of overbearing, and very often is saved from breaking limbs through carrying too heavy a burden. During the process of thinning the observant operator gains intimate knowledge of the quantity and quality of the crop to be harvested, and defective or unmarketable fruit can be thinned off; this not only saves time and labour during the rush of harvesting, but also eliminates a good deal of work in the packing shed by obviating the handling of under-grade fruit.

Thinning assists in disease control, for where fruits have been spaced and bunches broken up the essential sprays have a better chance of penetration and adequate coverage can be obtained. Especially does this apply in the control of leaf roller caterpillar (*Tortrix postvittana*), which frequently harbours in bunches of fruit where it is most difficult for the arsenate sprays to penetrate.

Care should be exercised during the operation, and each operator should be equipped with a pair of blunt-nosed thinning shears, without which

much damage to buds, especially on short-stemmed varieties of pip fruits, can be done by inexperienced workers.

Thinning should not be commenced until the natural fruit-drop is safely over. The thinning and spacing of the first early varieties should then be undertaken.

A knowledge of varieties is also essential, for where it is necessary to thin Dougherty apples or Winter Cole pears to singles it may not be so necessary to be as drastic on other varieties.

Recent Plantings

Attention should be given to young trees recently planted; unwanted shoots which will interfere with the desirable build-up of the framework should be pinched out and any necessary disbudding carried out. A little supervision during the first season's growth, when the first consideration should be the formation of the main branches, will be amply repaid later.

Equipment

Picking bags, ladders, and other orchard appurtenances should be overhauled in readiness for the coming season. A most useful part of orchard equipment is the trestle or stool, the measurements of which are as follows:—Length 3ft., height 2ft. 6in., built on similar lines to a carpenter's trestle, but with flat top of 3in. timber and 9in. wide; a strengthening board on the outside of legs a foot from the base acts as a step. It is cheap and easily constructed and where female labour is employed the trestle is convenient and easier to move around the orchard than some types of picking ladders.

—R. E. BINFIELD, Orchard Instructor, Hastings.

Citrus Notes

Deep Cultivation Affects Fruit Setting

BY the time these notes are published most citrus trees will be in full bloom and some may have passed this stage. The setting of the crop can be, and often is, adversely affected by cultivating too deeply, especially during November and December. Any cultivation during this period, either by hand or by machine, should be sufficiently shallow to avoid damage to the roots. In the case of oranges, and

to a lesser extent with other citrus, there are two distinct periods when the trees shed a percentage of the young fruits: the first is during the fortnight following petal fall, and the second usually about the third week in December, while in some seasons it extends to the end of December. Any injury to the roots during this period is certain to increase the dropping of the young fruits.

Harvesting

Most oranges, mandarines, and grapefruits are liable to lose a portion or all of their juice if allowed to remain on the trees too long. The period after the fruit becomes fully sweetened and before loss of juice commences varies greatly, according to the kind of citrus, variety, season, tree vigour, and age of trees.

The continuous showery weather for many months past, combined with light crops, has produced exceptional tree vigour, and under these circumstances growers are advised to examine their fruit frequently for signs of loss of juice. The practice of allowing the mature fruits to remain on the trees until late in the spring has a deleterious effect on the setting of the next crop.

Borer Control

Citrus trees are commonly attacked by the borer *Aemona hirta*, which is one of the major pests of mature citrus trees. The pest becomes progressively more difficult to control as the trees mature. The presence of the borer is detected by the wood dust ejected from the tunnels in the larger limbs, also by wilting of the smaller branches. Very frequently the larvae enter the trees in the first place through a dead twig or wound, consequently the frequent removal of dead twigs and the coating of wounds caused by broken limbs or in the course of pruning with a heavy grade of petroleum jelly will prevent infection to a considerable extent. Infected branches up to about 1 in. in diameter should be cut off and destroyed. In the larger limbs the

wood dust should first be cleared from the holes as far as possible and a fine wire inserted to kill the borer. Benzine or carbon di-sulphide is then injected into the holes, after which the holes must be immediately plugged with petroleum jelly to prevent the fumes escaping. Excessive use of these liquids should be avoided, otherwise injury to the wood may be caused.

Citrus Canker

The possibility of citrus canker appearing at any time and in any locality should never be lost sight of. Early detection of the disease may obviate the need for the complete destruction of an infected orchard. Growers should be constantly on the watch for possible infection; during the harvesting of the crop is an excellent opportunity for a careful examination of each tree. Any spots that are thought to resemble citrus canker even slightly should be immediately reported to the orchard instructor for the district.

The disease takes the form of circular brown spots varying in size up to about a quarter of an inch in diameter and always appears on both sides of the leaves. The spots, which are slightly raised, may also appear on the fruit or on twigs. A bright yellow "halo" invariably surrounds the spots on the foliage. The infected areas are normally surrounded by a thin, oily-looking border. Healthy trees are quite likely to become infected.

Pruning

Pruning should be completed as early as possible, especially where a heavy or severe pruning is being undertaken. If for any reason such pruning cannot be completed by about the end of October, it may be advisable to modify the treatment in the remainder of the orchard.

—P. EVERETT, Orchard Instructor, Kaikohe.

Trunk Injury by Banding

Citrus-growers using banding material for the control of Dicky rick weevil are warned against applying the material direct to the trunk of trees. Banding material applied direct to the bark of New Zealand grapefruit trees for several consecutive seasons has caused appreciable injury to the bark.

The injury so far appears to be confined to New Zealand grapefruit. Future bandings on this variety should be made on greased paper or, alternatively, applied in a different position each season.

Trees banded with these materials should be examined without delay, and if injury has commenced the material should be immediately scraped off.

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ISSUED BY FOOD AND RATIONING CONTROL

Guide for the Home Garden

There's Wisdom in Waiting

THE setting out of frost-tender plants too early has been commented on in previous issues of the Journal. Correspondence which has recently been received from home gardeners adds full testimony to the disastrous results which invariably follow this practice. Climatic vagaries and, above all, in very many districts the ever-present danger of late spring frosts, make attempts to secure an advantage in early production more or less a costly gamble.

In an effort to get very early potatoes, expensive seed has been planted and lost through the foliage being struck with a few degrees of frost. Provided the seed tubers are properly boxed for sprouting, and kept in a position where they will be properly protected from weather conditions which would destroy the young shoots, no material damage can be done, nor will the sprouts become unduly long and weak. As soon as potato shoots appear above ground hoeing should be done at once, thus destroying weeds which have germinated. If this hoeing is neglected and the potato growth is subsequently destroyed, by any cause whatever, it will not be possible to hoe the place where the potatoes are planted because of the risk of cutting the second growth of the tubers. The result, then, is most unsatisfactory.

Again, in the case of all members of the gourd family—marrows, pumpkins, squash, and cucumbers, which are all frost-tender—early sowing of seed may be very disappointing. This may be overcome by raising plants in boxes, which would be ready for setting out at the time which ordinarily would be considered safe for sowing seeds in the open garden. Boxes for raising young plants should be not less than 4in. in depth. In good, rich soil (a

Don'ts

DON'T dig a part of the garden and then make a path of it because all may not be immediately required for cropping. Allow the weeds to germinate, when surface hoeing will subsequently save labour in weed control.

DON'T permit all sorts of rubbish to accumulate in the garden and then complain of the damage done by woodlice. The moral should be plain—keep the garden clear of rubbish.

DON'T omit to keep supplies of lime and fertilisers in stock. If you wish to obtain these just when they are required, you may be disappointed.

mixture of good garden soil and compost will be suitable) four seeds may be planted 1½ to 2in. deep to each part of the box 6in. square. The raising box should be protected by removing inside a shed at night or during bad weather.

With the ground prepared, the young plants thus grown can be set out where they are to grow to maturity at a time when, ordinarily, seed would be sown. By adopting this method a favourable start will be secured, and the crop can be harvested sooner than would have been possible by the ordinary method of propagation and without the same risk. As recommended in the September issue of the Journal, when the danger of frost is past seeds may be planted straight into the garden.

Tomatoes

In the September issue of the Journal recommendations were made for pricking out and growing tomato plants for early setting. These plants, if properly hardened off, should be ready for setting out in their permanent place in the garden towards the end of October. Before planting the soil should be properly prepared by deep digging and thoroughly breaking up the second spit. When preparation is complete, and a furrow made along the line of row, blood and bone manure or bonedust, 4oz. of the former or 5oz. of the latter, together with a couple of handfuls of superphosphate, should be distributed to each 9ft. of row. This fertiliser should be thoroughly mixed with the soil. Before planting is started a stake should be driven where each plant is to be set. This precaution will ensure the plants starting their growing life with an undamaged root system.

The plants should be set in the ground to the depth of the first true leaves and the soil pressed firmly round the roots. Plants with small, rusty brown spots on any of the leaves should not be planted. If only the baby leaves are affected these should be removed, and the plants well sprayed—completely covered—with Bordeaux mixture half ordinary strength, i.e., 2oz. bluestone, 2½oz. hydrated lime, and 4 gallons water. This mixture is made as previously directed.

To home gardeners who may be desirous of growing the new dwarf tomato variety, Tatura, the following descriptive notes concerning it will be of interest. These notes are taken from a leaflet prepared by Mr. F. A.

Maheer, B.Agr.Sc., the original data having been published in the Journal of the Department of Agriculture of Victoria:—

"Tatura Dwarf Globe is an all-purpose tomato for home, market garden, and canning; habit dwarf to semi-dwarf; moderately resistant to the more common diseases. Second early to mid-season and second early to late in certain districts of Victoria. Ripe fruits are almost globular, medium to large (4 to 7oz.). Susceptible to circumferential cracking under conditions of excessive moisture, but generally not very susceptible."

To secure a full crop two additional applications of sulphate of ammonia at the rate of 1oz. per sq. yd. are recommended.

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Prepare for Winter Greens

Whatever may be the rush of work in the garden, preparations for autumn, and especially winter, supplies of vegetables should not be overlooked. From mid-October to the end of November will, in most districts, be the brief period when seed sowing and plant growing should be attended to. The list of seeds which may be sown can be made a lengthy one, but it should include early autumn savoy cabbages (Best of All and Drumhead Savoy); cauliflower (Phenomenal Early) to be harvested before they may be destroyed by frost; late savoy cabbage (Omega); Brussels sprouts (Fillbasket and Champion); broccoli (Lily White No. 1, and St. Valentine); silver beet (Giant Broad White Rib with curled dark leaf); kale (hardest of all winter green vegetables); leeks (Musselburgh and London Flag).

The seeds of these vegetables can be sown either in the open garden or in boxes. Except for leeks, the boxes should be not less than 4½ to 6in. deep, and the seed preferably sown in rows with ½in. soil covering.

Plant growing during the late spring and summer months calls for a great deal more care and attention than during earlier or later periods. When the seeds have been sown and covered the soil should be gently but firmly pressed down and so protected that the seed coverage will not dry out. Lack of moisture is fatal to good germination; hence, whether the seed is sown in the open or in a box, the sur-

face should be adequately protected until germination starts. When this takes place all covering, such as glass or paper, should be instantly removed.

Root Crops

Parsnips: November is the month when seed of this valuable winter vegetable should be sown, and the best variety is Hollow Crown. Fresh seed is highly desirable if good germination is to be assured. When sowing the lighter the soil coverage the better the germination is likely to be, provided the seed-bed is maintained in a moist condition. In germination percentage no vegetable in the garden bears the same reputation for disappointment. When sowing and covering has been completed a light dressing of finely-granulated compost would be an advantage in retaining the moisture in the top soil.

Swedes: Those gardeners who make a practice of an annual sowing of swede turnips and, by good management, have been successful in bringing the crop to maturity, never have cause to regret the labour involved. To have a supply of well-grown, healthy specimens of this vegetable ever ready for use during the winter months constitutes a valuable family asset.

December and January—the former month in the South Island—is the appropriate time for sowing the seed, and the best varieties for the home garden are Superlative and Laing's Garden. In the usual good garden soil 2oz. superphosphate per square yard will invariably give good returns. The rows may be spaced 12in. apart and the roots thinned to 6 to 8in.

Leeks: Musselburgh and London Flag are the best varieties known today, and will produce good heads of excellent quality. Seed sown during November and the plants later set out in well-prepared soil should provide a crop which can be used into October following the date of planting.

Kumaras: In most districts late October and early November will be suitable for planting out the "slips" of kumaras. These slips or rooted cuttings, as they may, for convenience, be termed, may be purchased from most seedsmen, where the vegetable can be grown. Light sandy soils are most suitable, and the slips should be planted, if practicable, where they will not be exposed to severe weather conditions. Soils or fertilisers with a high nitrogenous content should be avoided, as this will induce excessive vine growth at the expense of the tubers. A fertiliser made up of 1 part sulphate of ammonia, 3 parts superphosphate, and 1 part potash, applied at the rate of ½lb. to every 5 yards of row when working up the soil ready for planting, will give good results.

Celery

Early celery plants should now be planted out, either in beds or trenches. If it is not desired to board up the

bed or cover the main body of the plants either with soil or some substitute in order to blanch the ribs, the trench method should be adopted. This method, however, cannot be recommended unless a good supply of well-rotted stable or farmyard manure is available for digging into the trench bottom. On top of the manure a covering of 3in. of soil is necessary in which to set the plants. The trench may be any desired depth up to 12in. and the plants set 9in. apart.

When celery is grown in beds the plants can be set 12in. apart with the same spacing between the rows. Each bed may be composed of any number of rows up to six, which is considered the limit, four being more convenient.

Sweet Corn

Early November sowing of sweet corn seed, in districts where it can be grown, is considered the safest time. The plant is particularly sensitive to frost and cold conditions. For best production warm temperatures, night and day, are necessary, combined with a well-drained fertile soil, which contains a plentiful supply of organic matter. The plants can be grown in much the same way and at the same distance apart as bush vegetable marrows. Because of the shade which the tall growth may cast on other vegetables, a special place in the garden should be selected in which to grow the plants. Where well-rotted stable or farmyard manure is available a reasonably heavy dressing may be dug in before sowing the seed. When the plants are 2in. or so high superphosphate, 2oz. to each "hill," should be applied and worked into the soil. Suckers, which during early growth spring from the roots, should be removed.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

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Seasonal Work for Beekeepers

How to Produce Populous Colonies

OCTOBER and November is generally the most exacting time for the beekeeper. It is during this period that his experience and initiative are used in building up all his colonies to maximum strength, while at the same time adopting measures to see that excessive swarming does not jeopardise his chances of having the bees ready for the main honey flow.

Good Queens

Young, virile queens of a good honey-gathering strain will "deliver the goods," provided the beekeeper plays his part. Queens should not be tolerated in the apiary after they have had two seasons unless required for queen breeding purposes. Old queens may start off well in the early part of the season, but they generally commence to fail later when egg production should be at its peak. Some beekeepers are loath to destroy their older queens, as they contend that they are very often as good as the young queens. This may be so in some instances, but the risk of keeping them is too great, as the securing of a surplus crop of honey depends on the prolificacy of the queens to carry through until the honey flow is well advanced.

Good Combs

The ability of a queen to do her part is very often offset by the condition of the combs that are available to her. Damaged combs or ones with a large amount of drone comb should not be allowed in the brood nests. At this period of the year the maximum production of worker bees is desired, hence the necessity of seeing that the queen has access to combs with maximum worker cells.

Abundance of Stores

Heavy consumption of stores takes place during the period a colony is building up its strength, and unless a surplus is always available in the hive the queen will retard her egg laying accordingly. It is desirable to check excessive brood rearing in some districts during the early part of the season, but this should not be carried too far, or the colonies may not reach the required strength in time for the main honey flow. It must be remembered that it takes approximately 5 to 6 weeks from the time the eggs are laid

until the young bees take on the duties of nectar gatherers.

The following record, which was taken last season under favourable conditions, shows the rapid increase made in colony strength when all the above-mentioned features have been attended to by the beekeeper:—

September 7: 5 frames of brood recorded.

October 4: 7 frames of brood recorded.

October 11: 11 frames of brood recorded.

November 1: 18 frames of brood recorded.

November 15: 24 frames of brood recorded.

This colony would be classified as a strong one, and would be capable of collecting and storing a large crop of honey that season.

Weak colonies with only one or two frames of brood and a handful of bees at this period of the season should be culled out. Colonies in this condition should not be allowed to occupy equipment that would be much better employed on stronger colonies. The queen is generally responsible for this state of affairs, which indicates that more attention should be given to the replacing of old queens at the end of the season.

Paper Method of Uniting

This is the simplest way of disposing of all weak colonies. Towards evening place a sheet of newspaper on top of a fairly strong colony, after first removing the mat. Then quietly pick up the weak colony without its floor-board, and place it directly over the newspaper. By the time the bees from below have eaten their way through the paper the united colony will be accepted without dispute. In four or five days' time the combs can be re-adjusted, by which time the queen from the weak colony will have disappeared. Some beekeepers prefer to destroy the poor queen first, but this is not necessary where the bottom colony is of good strength and the top colony is weak in bees.

Swarming

Coupled with the building-up period in the apiary is the necessity to prevent swarming as much as possible. The

prosperity of an apiary in the days when skep hives were in common use was gauged by the number of swarms that came off. Today excessive swarming is looked upon as an indication that the beekeeper has slipped in his apiary management. Periodically certain conditions exist when even the most experienced beekeeper is sorely tried in keeping down extreme swarming. A colony of bees that is normal and prosperous in the spring increases its brood-rearing activities as its adult population increases. This work continues until all the available comb-room for brood is occupied, or until the queen reaches the limit of her capacity in egg-laying. Early in the spring only worker brood is reared, but when the colony becomes stronger the rearing of drone brood is also begun, thus providing for male bees in anticipation of swarming. Finally, when the brood chamber becomes crowded with bees and the combs are well filled with brood, several queen cells may be started. When eggs are placed in these partially-built queen cells the colony has then taken a definite step in preparation for swarming.

Prevention of Swarming

The following rules should be observed for the prevention of swarming:—

1. Breed young queens from a non-swarming strain.
2. Keep good combs in the brood nest so as to keep drone production down to the minimum.
3. Never let the brood nest become congested. Give more room a little ahead of anticipated requirements.
4. Allow for ample ventilation. Where narrow entrances are used the hives may be set up on small blocks. The addition of frames of foundation helps in breaking up the congested condition and at the same time allows for better ventilation. High shelter with still air around the apiary is very conducive to excessive swarming. It is advisable, therefore, to keep hives well out in the open.

The following two methods of swarm control used by many commercial beekeepers embody in their manipulations the above recommendations.

Demaree System

This plan may be described briefly thus: The combs containing brood should have any queen cells on them destroyed, and then transferred from

the brood chamber to a super, which is finally placed above a queen excluder, with the exception of one or two combs containing unsealed brood. The spare room in the brood chamber is then filled with empty combs, or if these are not available, with frames containing full sheet of foundation. The queen now has a new brood nest below the excluder, while the combs of brood removed are in the super above the excluder. In 10 days' time the brood above the excluder should be checked over and any queen cells started there should be destroyed. A variation of this plan is to use an extra super of drawn combs above the excluder with the brood above.

Division Board Plan

This is similar in principle to the Demaree system, but does away with the use of a queen excluder and at the same time allows a new queen to be raised. It is really a combined plan of swarm control and queen rearing. All brood except two combs and the queen are removed from the brood nest, with as many adhering bees as possible, to another super. The vacant space in the brood chamber is filled with empty combs, and on top is placed a division board. This can be made of thin timber with a rim of $\frac{1}{2}$ in. wood strips round the four sides similar to a floor-board, with a small entrance

on one side. It is an advantage to bore several large holes in the centre of the board and cover them on both sides with pieces of wire cloth. This allows heat to rise from the parent colony below to the division placed above. The entrance on the division board should face to the side or rear of the original colony, and the super, containing several frames of brood, bees, and honey, is placed on top. A ripe queen cell is then given to this division and the entrance blocked with green grass to check excessive drift of bees back to the parent colony. During the time that it takes the young queen to hatch out, mate, and commence to lay, the older queen down below has carried on with her egg-laying with the assistance of a large force of field bees, while above the division board the young queen commences to lay, attended by a large force of young bees. For a time the two queens may be allowed to carry on until the start of the main honey flow, when the lower queen is destroyed, the division board removed, and the top super with the young queen united by means of the newspaper method. During the period that the two queens are in existence, supers may be added to either division as required. To carry out this method cell raising requires to be carried out prior to making the divisions.

Conclusion

All supers of extracting combs should be checked over and where fumigants have been used to check wax moth depredations combs should be well ventilated before placing out on the hives.

—C. R. PATERSON, *Apiary Instructor, Hamilton.*

Orchard Diseases

THE results of investigations carried out by the Plant Diseases Division are embodied in the Department's **free** bulletin No. 161. This bulletin deals with the various sprays in common use, their dilution and combination, and sets out spray schedules for apples, pears, stone-fruits and citrus fruits. The treatment and disinfection of tree wounds is also explained. A copy of this informative **free** bulletin may be obtained from the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.

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Notes for the Poultry Farmer

Production of Green Food

NO poultry farm is complete without an area under cultivation for ample supplies of succulent green material. The green food patch is of paramount importance for every poultrykeeper unless other sources of supplies of green food, such as watercress, lawn clippings, and suitable vegetable tops, are available in the district at a nominal cost or just for the labour involved in collecting them. While it is important that this food should be in abundant supply, it is also imperative that it be of such quality that it will be readily consumed and relished by the birds, either when fed separately or incorporated with other foods given in their daily ration.

It is questionable whether the true value of a plentiful supply of succulent green food is sufficiently realised, for on many places fowls get only what they can pick up in the pens or fields. This is not enough, and where poultry are kept in limited areas the ground quickly becomes tainted and stale, with the result that the quality of the green food available is of little value from a feeding point of view. On some farms one sees no great attempt to cultivate the soil for growing suitable supplies of green food.

Economical and Health-giving Food

Abundant supplies of green food not only make for economical production, but they are essential for the maintenance of the good health of the birds. Now that grains and meals are at high price levels and are also difficult to obtain regularly, it will pay well to feed green food and suitable root crops with a liberal hand. The young leaves of growing plants and blades of grasses are a most valuable food for poultry because of their natural juices, and when fed in regular supply they assist Nature in imparting fresh life to the birds. They also prevent troubles caused by the confinement of poultry to limited areas.

The necessity for regular feeding of green food to young growing stock cannot be too strongly advocated. They always make the best growth when they do not receive a setback of any kind, and often the worst check of their healthy development may be caused through the lack of green food during the growing stages. While green food materially assists in reducing the cost of feeding, therefore, it also maintains

the good health of the fowls, building up their vigour and resistance to disease.

Effect on Quality of Eggs

Complaints are frequently made by consumers about the paleness in the colour of the yolks. This is generally due to the birds not receiving sufficient and regular supplies of good-quality green food, which particularly applies where poultry are kept under intensive methods of housing.

Green food is also of considerable importance to breeding stock, and its value is reflected in the embryo development of chicks and the production of chickens with strong vitality, so that no poultrykeeper can afford to neglect the vital importance of seeing that his flock is supplied regularly with a good variety of succulent green food.

Suitable green materials can be obtained from various sources on the farm. Firstly, there are permanent green food areas which can be laid down, including lawns and lucerne, clover or watercress patches, which supply large quantities of good green food over the greater part of the year.

Secondly, there are seasonable green materials which are best planted at certain times of the year, and, if given good average cultivation and general care, will supply abundant quantities of very good green stuff for many months. In this case, it will be necessary to replant each season at suitable times for the best growth in the district concerned. These crops are silver beet, Chinese or mustard cabbage, or those of the cabbage family, such as rape, kale, and choux moellier.

Thirdly, a particularly good method of producing large quantities of succulent green food is by catch crops which can be planted almost at any time of the year or sown down at certain seasons most suitable for their quick growth. The best for this purpose are oats, cape barley, Japanese millet, maize, and garden vegetable plants, such as lettuce and cabbages.

With all these sources, there is little reason for poultrykeepers to be short of green foods at any time of the year in this country. However, it is generally realised that the cold winter months are the worst season for obtaining regular supplies. Preparation

for this period can be made by planting in the cultivated areas at suitable times a plentiful supply of root crops, such as carrots, beet, mangolds, swede turnips, and onions, as well as those vegetables of the gourd family, such as marrows and pumpkins. All these can be used most successfully at the time of the year when green foods are in short supply.

Feeding Green Food

Almost any vegetable top is suitable for feeding, but the leaves must be fresh, crisp, and as tender as possible. Coarse, dry, stringy green food contains too much fibre, and often causes impaction of the gizzard or crop binding of the birds. Variety is valuable, as some green foods contain different feeding values from others, but it is important that no sudden changes of green food are given when the birds are doing well. The best method is to introduce a change a little at a time until the birds have become accustomed to it.

Many cases of troubles being caused in this way have come under our notice. In one particular instance a sudden change was made in January from succulent green lucerne to hard-hearted yellow cabbage for a large flock of good-laying White Leghorns. The result was disastrous; not only were digestive troubles set up, but the great majority of the birds were forced into an early moult, causing considerable financial loss.

Green food in the form of leaves can be hung up in bunches in the houses or placed in wire-netting baskets or green-food racks about 12 inches from the floor, but should never be thrown on the ground for feeding purposes. If the feed can be cut up finely, so much the better, as the birds will always eat more when the green food is chaffed to a reasonable size.

Where moist mash is fed at least one-third of the bulk can be good green food prepared in this way. In fact, the writer has known up to 45 per cent. of the bulk to be included in the mixture and fed to the poultry with excellent results.

In using the green food in the mash, the best method is to mix the green chaffed food with the dry meals overnight and then cover with a sack until morning. The liquid is then mixed with it until the mash food is in a dry, crumbly condition. This method allows the meals to absorb some of the flavour of the green food, making the mash very palatable to the birds, while

the amount of liquid used for mixing is not nearly so much as when the foods are all mixed fresh at the one time. Even when green food is fed in this way it is a good plan to give a little extra fresh-cut green food to the fowls in the latter part of the afternoon. This acts as Nature's tonic. If a study of poultry habits is made with birds on free range, it will be observed that even after the fowls have eaten up their evening grain diet they will roam some considerable distance from the house in the search for young tender blades of grass, and it is always wise to follow Nature's methods.

Root crops are best sliced in half and placed on spikes on the lower parts of the walls of the house, but well clear of any dirty litter on the floors. This keeps the flesh of the vegetables as

clean as possible, and once accustomed to them the birds will hollow them out to the skin.

Permanent Green Foods

Freshly-cut lawn clippings make excellent green food, and if they come from good grass pastures which have been well topdressed it is doubtful whether greater feeding value can be obtained off any given area of land. At the same time, this method of obtaining green food lends itself to keeping the grounds of the home and entrance to the farm in a pleasing order, and supplies abundant quantities of suitable green material during the spring and autumn months.

In laying down a lucerne patch care should be taken to prepare the ground thoroughly before planting. Regular cultivation of the soil during the

spring months will destroy most of the spring weeds. For poultry farm work planting the seed about the end of November and sowing it in drills about 15 to 18 inches apart will prove better than broadcasting, as it allows for weeding. Once established, the lucerne is not hard to keep in order, and the quantity of food produced will amply repay the trouble.

Watercress is one of the best green foods for poultry. It contains a good deal of iron, is always succulent, and appears to act as a great tonic to the birds. Like Chinese cabbage, mustard, and cress, it is hot to the taste. This causes the flow of greater quantities of saliva in the mouth, thus aiding the digestion of the foods eaten.

Seasonable Crops

Probably the best seasonable crop is silver beet, which is excellent for poultry. It is a heavy cropper, and is not subject to attacks by insect pests, as are many other plants. Sow the seed in the spring, and transplant early in December. With a reasonable season and average cultivation, one is assured of a plentiful supply of young, succulent leaves in the early autumn.

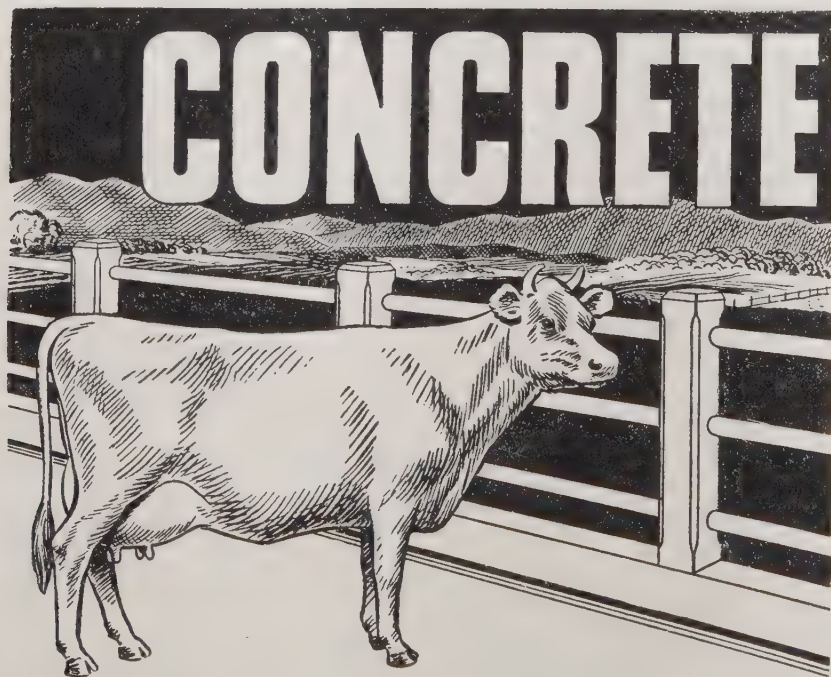
Where insects attacking cabbages are not troublesome chou moellier, kale, and rape can be grown. A useful method is to grow them in the poultry runs, and not only will this help to clean the ground, but if the birds are not allowed on the runs until the plants are well developed, they can then pick at the leaves without doing a great deal of damage to the plants. It will thus afford shade as well as green food during the summer months.

Catch Crops

In addition to the crops which are grown in the cultivated area of green food patch, both oats and barley are most useful. They can be planted in the poultry runs in the early autumn, when on many farms the young pullets are being housed for winter egg production. The growing of oats or barley mixed with grass in these runs is highly desirable. Two or three cuttings of these cereals can be taken off the areas during the winter months, providing a very useful adjunct to the green food supply. When the spring arrives and it is time to allow the birds out again the runs are renewed in fresh green pasture.

In conclusion, the production of abundant supplies of green material lends itself to better management of poultry. Not only does it make for the production of better quality eggs and stock, but, if carried out on sound lines, it will go a long way towards keeping the plant in good order, preventing the ground from becoming tainted, and the fowls from becoming sick.

—E. C. JARRETT, Poultry Instructor, Auckland.



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Federation of Young Farmers' Clubs

Another Club Formed in Middle East

The following interesting letter has been received from Pte. C. B. Anderson, formerly secretary of the Bulls Young Farmers' Club:—

IT gives me very much pleasure to notify you of the formation of a Young Farmers' Club in the 22nd N.Z. (Motor) Btn.

Through Padre Sullivan a meeting of those interested was held at the Y.M. C.A. tent and the inaugural meeting was held on Saturday, June 24, with about 65 present.

It was resolved that a club be formed and the following officers were elected:—Patron, Lt.-Col. H. V. Donald; chairman, Sgt. A. A. Franklin; secretary, Pte. C. B. Anderson; advisory members, Padre Sullivan and Lt. N. McG. Cooper; committee, 1 Coy, A. Viles, H. W. Mohr; 2 Coy, S. Christopher, N. Bird; 3 Coy, P. Mason, R. R. Herbert; 4 Coy, C. Ancrum, T. Western; Admin., I. S. Kay, C. Budd.

Affiliation with the federation was decided upon and application is herewith made for same.

Policy

To hold meetings every Thursday night at 7 o'clock, any extra attractions to be advertised in the "Argosy" (the battalion news sheet), with lectures, quiz evenings, debates; and to hold field days and take advantage of any educational facilities offering.

To express confidence in the movement in New Zealand and to offer every support to clubs on our return to New Zealand.

Ex-members to contact their clubs.

Membership to be open to all men in the battalion.

This was adopted by the meeting.

We are intending to take advantage of E.R.S. courses and for this purpose Thursday night of each week is being set aside and an accompanying talk will be given by Lieut. Cooper on the subject under review. The first will be on stock production, a subject Mr. Cooper has particular interest in.

The following ex-club members were present: I. S. Kay, Banks Peninsula Y.F.C.; T. L. McDonald, Hunterville Y.F.C.; I. F. Thompson, Pukengahu Y.F.C.; G. I. Johnson, South Taieri Y.F.C.; A. R. Viles, Apiti Y.F.C.; R. R. Foleman, Carterton Y.F.C.; P. A. Mason, Halcombe Y.F.C.; C. B. Anderson, Bulls, Y.F.C.; S. Last-Harris, Bulls Y.F.C.

Good Meeting

On Thursday, June 29, a very good meeting was held. The speaker was 2nd Lieut. Forbes McHardy, who dealt with the problem of rehabilitation as far as it would affect men returning and taking up land. As it was a matter that will concern a large number of the members, the subject was a good one for an early meeting, and it created a great deal of interest. Particulars of courses at Massey College for returned men were read out and copies will be distributed among companies. There were over 100 present, and all points to a very successful future. Several speakers are "jacked up," and we will also have quiz evenings with the audience as a "brains trust." A field day is well under way, and I will send further details afterwards.

Padre Sullivan has been a great help to us, as he is with all matters of this kind in the battalion. He took quite an interest in the club at Te Awamutu before coming overseas, and will no doubt be remembered by the Te Awamutu members. We are very fortunate in having Mr. Cooper in our midst and he will be a tower of strength to us also.

We would be grateful for a few copies of the Journal and any other literature of interest you can send along. I will close down for now and write another time. I had a very interesting letter from Steve Avery a few days ago and am pleased to know the young farmers at home are doing well and keeping on their feet.

Accept my kind regards, and I wish to be remembered to all my young farmer friends.

Yours sincerely,

C. B. ANDERSON, Secretary,
22nd N.Z. Motor Btn. Y.F.C.

Mr. Anderson's address is:—
No. 378261 Pte. C. B. Anderson, No. 1 Coy., 22nd N.Z. (Motor) Btn., 2nd N.Z.E.F., Middle East Forces.

ROPES

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Mid-Canterbury District Committee

AT a recent meeting of the Mid-Canterbury Y.F.C. District Committee the chairman, Mr. R. Wightman, jun., presided. The secretary reported the formation of a club at the Ashburton District High School. Delegates from the new club were welcomed to the meeting, and it was decided to make the club a grant of £1 ls. to assist it with its initial expenses. A report on the meeting of the Canterbury council was given by Messrs. Bennett and Chisnall. Messrs. A. McKay and J. R. Cocks were appointed delegates to the Canterbury council in place of Messrs. H. L. Chisnall and R. Wightman, both of whom are now acting on the council in other capacities.

It was decided to request the council to forward copies of the conditions governing Y.F.C. scholarships to all clubs in Mid-Canterbury.

Debates

A recommendation was made to the Canterbury council to hold inter-district debates this year. An invitation from the Rotary Club to hold a short debate at a forthcoming Rotary Luncheon was accepted, and arrangements made for teams of two members each from the Hinds and Methven Clubs to take part. A debate between the Ashburton Club and the High School Debating Club was also arranged, the date to be fixed later.

The district stock-judging competition was fully discussed, and the final arrangements left to the Methven Club, the competition to take place at a convenient date in October.

The chairman extended the congratulations and best wishes of the meeting to Mr. J. Fleming on his recent marriage.

very good yield, and 56 was the highest he had known in Australia. A good proportion of the fat lamb trade was also associated with wheat growing, the sheep being used to graze the fallow for the purpose of keeping down weeds. Thus the number of fat lambs derived from this type of farming was necessarily limited. He warned his audience, however, that the fat lamb trade in Australia is, in general, capable of considerable expansion. The present export of 4,000,000 carcasses could with little difficulty be increased to 10,000,000.

Mr. Geddes considered that dairying in Australia is a depressed industry compared with its counterpart in New Zealand. There are two distinct types of dairying; in the Gippsland district of southern New South Wales conditions are very similar to those prevailing in New Zealand. The bulk of the rainfall is in the winter months, and English grasses are grown. North of Sydney the main rainfall is in the summer, and is associated with a "monsoon" type of climate; here, in the coastal districts, *paspalum* grows luxuriantly, and is grazed in dairying.

Waihaorunga Sponsors Address

Mr. A. H. Geddes Interests Large Audience

ON the occasion of an address by Mr. A. H. Geddes, a former Waimate boy who now occupies an important post at the Sydney University, the Waihaorunga Club called a general meeting of the district. The fact that the Waihaorunga School was packed to the doors by an appreciative audience showed that their confidence was amply justified.

Mr. Geddes, who is a son of Mr. Robert Geddes, of Ikawai, was educated at Ikawai and at Timaru Boys' High School. After taking his degree at Lincoln College he went to Tasmania, taking up a position there with the Department of Agriculture. After some years there and a further period as agricultural editor of the Melbourne "Weekly News" Mr. Geddes was appointed four years ago to his present position as Lecturer in Animal Husbandry at Sydney University. This appointment is of particular interest to young New Zealanders, as Sydney University is one of the places at which those who wish to become veterinary surgeons must study.

Subterranean Clover

Mr. Gordon Armstrong, chairman of the Waihaorunga Club, introduced Mr. Geddes to the meeting. Mr. Geddes referred first to the remarkable improvements which had been

effected at Lincoln College since his last visit, more than 11 years ago. He mentioned particularly the Ashley Dene farm, the carrying capacity of which had been more than doubled. This was due to the use of subterranean clover, which provided the key to the exploitation of light land in the Canterbury district. Subterranean clover was used in a very large way in certain districts of low rainfall in Victoria and Tasmania, and its use was being rapidly extended; an annual dressing of superphosphate was necessary to ensure that it thrived.

The speaker touched upon the small seeds trade, and stated that New Zealand's certified strains of ryegrass, cocksfoot, and white and red clovers performed very well in the higher rainfall areas. It was his opinion that there should be a permanent market at profitable prices for these seeds in Australia.

Contrasts in Australia

He described aspects of Australian farming which contrasted with practice in New Zealand. Wheat growing in Australia was a very specialised industry, highly mechanised, and over very large areas of perfectly flat land a crop of wheat was alternated with a year under fallow. Thirty bushels of wheat per acre was considered a

Dependence on Wool

The speaker emphasised the dependence of the Australian economy on the wool cheque. The increasing use of wool substitutes is a matter of very grave concern to Australia and New Zealand. He referred to the possibility of the establishment of a comprehensive scheme of research and publicity, involving an expenditure of round about £250,000 per annum. He spoke of the irrigated land in Australia being used for stock raising, rice growing, and fruit farming. He said that beef cattle were extensively reared in Queensland, but that the tendency is for sheep to replace cattle. He stressed that the greater bulk of the country is desert, and, as far as could be seen, practically useless. The scope for increased population is not as great as many would imagine.

Mr. Geddes answered many questions concerning farming and related matters in Australia, and raised some hearty laughs by his dry and pointed remarks. At the conclusion of his address he was accorded a very hearty vote of thanks. During and after supper a number of those present took the opportunity to renew old acquaintanceship.

Excessive Wastage

in the pig industry represents a serious loss to farmers and to the country. Bulletin 15, available free from offices of the Department of Agriculture, reviews factors leading to such wastage, and contains valuable information regarding its prevention.

Field Days

Wanganui District Committee

By Malcolm F. Gray, Hon. Secretary, Marton Y.F.C.

THE field day held at Mr. A. C. Vile's property, Upper Tutaenui, Marton, and arranged by the district committee and organised by Mr. Vile and officials of the Marton Club, was highly satisfactory. Though there was a rather keen wind, the day remained fine and a good attendance of upwards of 60 young farmers, farmers, and friends did much towards making the occasion a success.

The committee is most grateful to Mr. Vile for the use of his farm and also wishes to thank all those who lent stock for the various demonstrations. Mr. Vile stated that he was only too pleased to be able to assist and was very glad to see so many present, particularly members of the Ohakea Club, who, despite their service duties, find the time and inclination to keep a club functioning.

The morning was taken up with a demonstration of mole draining by Messrs. G. J. Wood and C. W. Stafford, assisted by Mr. A. L. Vile with the tractor. Approximately 20 were present at this demonstration, which was most instructive, particularly in view of the increasing popularity of mole draining. Mr. Wood said he hoped the demonstration had been of practical value to those who had witnessed it, and also pointed out that in draining there are no short cuts—it is all hard work.

Demonstrations on Stock

The main part of the programme began soon after one o'clock with a demonstration on Southdown sheep by Mr. A. C. Vile. As he was able to use only crutched lambs, Mr. Vile regretted that it was not possible to show some of the main points as clearly as he had wished. Still, such important items as skin colour, face colour, and type of wool were adequately covered.

Mr. R. T. N. Fergusson, Turakina Valley, then demonstrated the main points on Romney sheep; this was probably of the greatest interest to the majority of those present. Mr. Fergusson's contention is that as meat will most probably be New Zealand's main standby in the future, we must concentrate on breeding a type which will produce most meat per pound of bone. He also mentioned such important points as the connection between the hair on the face, the wool, and the position of the front leg in relation to the shoulder. His advice to any young farmers starting breeding was not to be too particular on the

minor points at first; get constitution and conformation and then deal with the less important details.

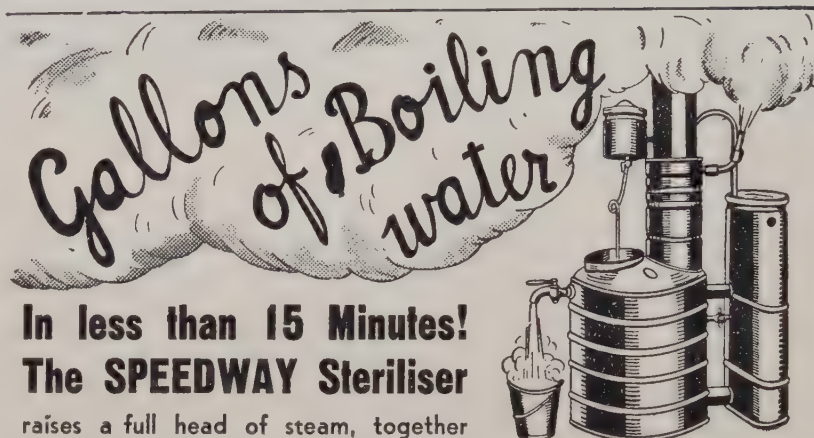
A notable feature of both these demonstrations was that comparatively few questions were asked. Whether this was due to a general reluctance or hesitancy to ask questions or not, it remains to be said that both speakers stated that more questions would have been a great help in making the demonstrations more interesting. It is hoped that in future young farmers, and farmers, too, for that

matter, will bring a greater supply of questions for the various demonstrators.

Mr. J. M. Murray, Woodville, gave a very thorough talk on the dairy cow. It was evident that Mr. Murray had been to no small amount of trouble in preparing his talk so as to present the facts in their logical sequence. He grouped his matter under five main headings, beginning with the heart and lungs and carrying right through to the ultimate source of the milk supply. Many farmers, he said, were disappointed with the results obtained from expensive bulls. This was most likely due to the animals having weak heads, a fault far too commonly overlooked.

Hydatids and Bad Teeth

After an interval for tea Mr. Geo. McDonald, veterinary surgeon, Rata,



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gave a most instructive and, in his inimitable way, humorous post-mortem examination of a sheep. He mentioned several theories which have been proved wrong, and also described how copper sulphate (bluestone) causes a reflex action, opening a groove and allowing drenches to pass straight to the fourth stomach, where they are able to work undiluted. He also gave the alarming information that New Zealand heads the world, along with Paraguay, Uruguay, and other such "uncivilised" countries, in hydatids, and is also "famous" for goitre and rotten teeth. A New Zealand football team is as fine a looking body of men as one would see anywhere, and yet most of them have scarcely a tooth in their heads! Questions came far more spontaneously at this demonstration.

The committee desires to thank the demonstrators for sparing their valuable time to give the talks, and assures them that their services were very much appreciated by all present. Thanks are also due to officials of the Marton Club for arranging for the stock for the various demonstrations.

Luncheon and afternoon tea were provided by the Marton Club and were much appreciated by all. The thanks of the Marton Club go to Mrs. Vile and her band of willing helpers, for without their valuable assistance the project, which showed a credit balance of 27/9d. would have been well-nigh impossible.

Marlborough District Debate

By N. J. Hammond, secretary, Seddon Y.F.C.

A DEBATING contest was held recently at Ward between teams from the Flaxbourne and Seddon Clubs. The subject of the first debate was "That Wool Production is more profitable than Fat Lamb Raising on Medium to Good Class Land." Speakers: Seddon (affirmative), R. Denton, N. Gee, and K. Hammond; Flaxbourne (negative), A. Wooding, J. Thomson, and F. Rudd. The subject of the second debate was "Synthetic Wool versus the Raw Material." Speakers: Flaxbourne (affirmative), T. Loe, M. Johnstone, and E. Butt; Seddon (negative), M. McKee, K. Dysart, and H. Gluyas. Flaxbourne gained the award in the first debate, and Seddon won the second. Mr. Ching acted as judge, and Messrs. Morrin and W. Kennington as chairman and timekeeper respectively. The debate was keenly enjoyed by all present, and the proceedings closed with supper, which was supplied by the Flaxbourne Club.

Bunnythorpe Club: Mole Draining

By R. E. Cleverly, Bunnythorpe Y.F.C.



The mole draining demonstration. Mr. Hudson is bending down at the front of the tractor.

A MOST successful field day was held under the auspices of the Bunnythorpe Young Farmers' Club, demonstrations of various methods of mole drainage being given by Mr. A. W. Hudson, of Massey College. Mr. Hudson, who is acknowledged as an expert on the subject, was keenly followed throughout by the 100 farmers who attended the demonstrations.

Firstly, he showed the working of a simple home-made apparatus for the taking of levels. Levels were most deceptive, especially on rolling country, but by the use of the particular apparatus the judgment of the human eye could be checked. This apparatus consisted of two glass tubes (one at either end) containing coloured water (for clearer sighting) mounted on an up-edged 3in x 1in beam, 4ft. in length, standing some 3ft. or 4ft. above ground level.

Mr. Hudson proceeded to demonstrate the three proven methods of effecting junctions between minor and major drains. Firstly, by joining at the same level at an angle of between 30 and 45 degrees. Secondly, by clearing, by the McLeod method, drains pulled at a greater angle. Thirdly by "spearing" the minor into the major at different depths.

Mr. Hudson referred to another method under trial, which he considered very promising as an easy way of joining minors to majors; this was the "cut-top" method, practised by pulling the major first, at a depth, greater than the minors, equal to the

diameter of the plug. When the minors are pulled above, at angles from 45 to 90 degrees, the bottom of the minor being about the same level as the top of the major, either a hole is left between two, or the layer of clay is so thin that it breaks down easily when the water flows in the minor.

Due to the danger of the outlets being trampled in, the points of final discharge should be reduced to a minimum without endangering the efficiency of the whole system. These outlets should also be protected by either a tile or a block of wood across the top held securely; or both.

At the conclusion of the demonstrations thanks were accorded Mr. Hudson by the chairman of the Bunnythorpe Club, Mr. S. Anderson, who also thanked the contractor who performed the draining, Mr. E. Hodgson, and Mr. W. Andrew for the use of the land for the demonstrations.

The club was also accorded thanks for staging the field day and providing light luncheon.

To keep fowls in health and reasonable production a knowledge of certain fundamental principles of poultry-keeping is essential. Bulletin No. 211, "Backyard Poultry-keeping," available free from offices of the Department of Agriculture, provides the minimum knowledge that the backyarder should possess, and includes plans for houses for 6 and 12 birds.

Reports on Club Activities

WESTERN SOUTHLAND.

Southland Technical College.—Exhibition of film-strips (1) "The Nerve System," (2) "The Animals of the World," (3) "The Life of Louis Pasteur." At the previous meeting two debates were held on the following subjects: "That Life on a Sheep Farm is to be Preferred to Life on a Dairy Farm," and "That every Dairy Farmer should maintain a Stud Herd." The attendances at these meetings were 60 and 57 respectively, out of a total membership of 78.

Woodlands.—Debating team selected for annual contest at Invercargill, consisting of the following: A. S. Trotter, K. Maxwell, and K. Kerr. Mr. A. S. Trotter, who is chairman of the Otago-Southland council, reported on the recent council meeting held in Dunedin, and also on the annual general meeting of the Y.F.C. Federation, held in Timaru. The chairman, K. Maxwell, read a paper entitled "Pregnancy Toxaemia in Ewes," which had been prepared by Lincoln Agricultural College. Fourteen members in attendance out of 18.

SOUTH OTAGO.

Clinton.—Next meeting to take the form of a social evening with impromptu speeches. E. Roseveare and C. Turnbull selected as delegates to the South Otago district committee. Mr. F. Carson, manager of the Kaitangata Coal Mine, gave an interesting address on "Coal Mines and Mining." A trip through the Kaitangata Coal Mine is to be arranged. At previously unreported meetings addresses were given as follows: Mrs. A. T. Harris, of Clinton ("A Trip through England and the Continent early in 1939"); Mr. R. O. Pannett, of Wairuna ("Southdown Sheep"). The attendances were 10 in each case, out of a total membership of 15.

Warepa.—Final arrangements for the club ball. A Dutch auction was held, the club funds benefiting to the extent of £2 13s. Address by Mr. Carr, of Dunedin, on "Finance." One new member enrolled. Attendance of 21 members out of 28.

DUNEDIN.

West Taieri.—Address by Mr. A. Miller on "The Care of Ewes at Lambing Time." Nine members present out of 18.

NORTH OTAGO.

Enfield.—Correspondence re shearing school; several members keen to take part in course. Annual report of Otago-Southland council read and discussed. Report on club's annual dance; raffles for club funds showed a balance of £3 4s. 1d.; profit for Patriotic purposes £2 14s. 5d. Football match v. Ardgoon resulted in a win for the club by 5 points to nil; the dance held at night showed a profit for Patriotic purposes of £7 11s. 6d. Mr. H. Meek, a local contractor, addressed the meeting on "Farm Machinery"; he dealt very fully with his experience with tractors, and gave some very useful hints. In a competition for the drawing up of a plan of a 200-acre farm L. Forrest was the winner. Twelve members attended out of a total of 16.

SOUTH CANTERBURY.

Cannington.—Debate to be arranged with Pleasant Point Y.F.C. Address by Mr. E. W. Hall, who spoke on his experiences in the Middle East. Ten members present out of 17.

Geraldine.—Christmas parcels to be sent to members in the Middle East and Canada. Talk by Mr. S. R. Muff on "Herd Testing, Cheese-making, and Butterfat Prices." Sixteen members present out of 34. At the previous meeting a talk on "Weather Recording" was given by Mr. Darby Robertson. Members stood in silence as a mark of respect to Corporal Mervyn Brenton, a former chairman of the club, who has been killed in action. An attendance of 18 members.

Waihaorunga.—Officers elected at the annual meeting: Advisory president, Mr. G. Barclay; chairman, G. Armstrong; vice-chairman, M. Gardner; secretary, I. Hurst; treasurer, B. Armstrong; press reporter, A. Hurst; trustee, J. Barclay. The following talks, debates, etc., took place at recent fortnightly meetings, previously unreported: Mr. Pickering (W.E.A.), address on "The Food Problem after the War"; Mr. E. J. Lukey, Government veterinarian, address on "Livestock: its place in Peace and War"; Mr. A. H. Geddes (Sydney University), address on "Farming in Australia"; two debates between club teams and teams from the Women's Institute, "That a Community Centre is essential in Waihaorunga," and "That a Woman should Receive Equal Pay to a Man for Equal Work"—the former was won by the Women's Institute, and the latter by the club team; supper and a dance followed the debates. Impromptu speeches were given at one meeting, and at another a paper on "Farm Mechanisation" was read and discussed. The attendances varied from 17 to 21.

MID-CANTERBURY.

Ashburton D.H.S.—A debate was held, the subject being "That Small Farms are Better than Larger Farms." Speakers, D. Gill and W. Crouchley (affirmative), G. McArthur and M. Gill (negative). The award was gained by the affirmative team, by 204 points to 191. At the conclusion the judge, Mr. Dallison, gave the speakers some very helpful criticism. Letter of sympathy in his illness sent to Mr. R. M. McGregor (advisory president), with hopes for his speedy recovery.

Methven.—Five new members enrolled. The following reports were given: Annual meeting of the federation (Mr. R. Wightman, chairman of the Canterbury council); meeting of the Methven A. and P. Association (W. Hart); meeting of the Mid-Canterbury District Committee (A. McKay); inter-club debate at Ashburton, won by Methven (G. Limbrick); debate at the Rotary Club Luncheon, Ashburton-Methven debated against Hinds, the subject being "Which is Better, Optimism or Pessimism?" (A. McKay). Arrangements for the inter-district stock-judging competition, to be held on Mr. R. J. Low's property; sheep to be judged, English Leicester and Southdown. The results of the club's dog trials were announced. Social to be held in the near future. Address by Mr. Robinson, veterinarian, Lincoln College, on "Marking of Lambs and Diseases Arising from Same." There was an attendance of 35 members out of a total of 68.

NORTH CANTERBURY.

Oxford.—This club has recently resumed activities after a long period of recess. At its second meeting 10 new members were enrolled, and 25 members were present out of 25—a hundred per cent. attendance! An interesting and instructive lecture was given by Dr. Burns, of Lincoln College, on "Soil Fertility."

MARLBOROUGH.

Flaxbourne.—Reports of two recent meetings: At the first one new member enrolled. Talk by Mr. Irving, entitled "Here and There from a Business Career." Ten members present. At the second one new member enrolled. Arrangements for a practice debate, in view of coming debate with Seddon Y.F.C. Younger members present took part in an impromptu debate, each member speaking for 10 minutes. Thirteen members present.

Seddon.—Two meetings, as follows: Address by Mr. Lockhart on "The Running of a Meeting," followed by impromptu speeches of two minutes' duration. The subjects for the speeches were chosen by the chairman, and all members filled in their time easily. At the second meeting a debate was held, the subject being "Should Stud Stock be Exported?"; speakers, M. McKee and R. Denton

(negative), H. Gluyas and K. Langridge (affirmative). Challenge issued to Flaxbourne Y.F.C. for a debate. Sixteen members present out of 24.

NELSON.

R.N.Z.A.F. Station.—At recent meetings, the usual discussions on such subjects as "Farm Improvement," "Grass Management," etc., took place, and the following lectures were given: "Wool Spinning and Dyeing," by Mrs. Moncrieff, noted naturalist; "Identifying of Grasses," by Messrs. Madden and Harris (Grasslands Division, Department of Scientific and Industrial Research); and "Wool Classing," by Mr. Geo. Hobbs. Eight new members enrolled, but this, unfortunately, was offset by departures.

MANAWATU.

Bumbythorpe.—Discussion on the club's proposed radio talk (Station 2ZA, Palmerston N.) on "Mole Draining"; decided that the talk be prepared and delivered. An address on "Feeds and Animal Nutrition" was given by Mr. Barnicoat, of Massey College. Twelve members present.

Oroua Downs.—Discussion re supper fee. Arrangements for a dance. An effort to be made to recruit members from among secondary school pupils. Lecture by Mr. H. A. Bayley, inspector of stock, Department of Agriculture, on "Seasonal Stock Ailments and Diseases." Eighteen members present out of 31.

Pohangina Valley.—This club has been successfully revived after having been in recess for two years. Messrs. S. G. Avery (chairman, Wellington council) and S. Freeman (Dominion organising secretary) were present at the meeting, and addressed those present on Y.F.C. affairs and activities generally. The following officers were elected for the ensuing year: Advisory president, Mr. H. M. Linklater; chairman, J. Howell; vice-chairman, R. J. Moar; secretary, R. G. Passey; treasurer, H. McDonald. At the following meeting a lecture on "Seasonal Ailments of Stock" was given by Mr. H. A. Bayley, inspector of stock. There was an excellent attendance, 19 members—the total number enrolled to date—being present. There is every prospect of this club being a success, and it is anticipated that steady progress will be made during the next few months.

Rongotea.—Lectures given at last two meetings: "The Supply of Electricity in New Zealand," by Mr. C. Taylor, Palmerston North; the speaker gave an outline of the present hydro-electric scheme, and its proposed extension; "Animal Husbandry," by Mr. H. A. Bayley, inspector of stock, who dealt with the diseases and seasonal ailments of dairy stock, and their prevention and cure. There were attendances of 12 and 10 members respectively, out of a total membership of 28.

Whakarongo.—This club has been recently revived after a period of two years in recess. Messrs. S. G. Avery (chairman, Wellington council) and S. Freeman (Dominion organising secretary) were present and addressed the meeting. Members of the Bunnythorpe Club were also at the meeting. The following officers were elected: Advisory president, Mr. J. McCool; chairman, I. Tabor; vice-chairman, J. Spall; secretary, D. Clark; treasurer, B. McCool. Nineteen members were enrolled at the meeting. The club has every prospect of making a successful recovery; it is fortunate in having a keen and enthusiastic club—Bunnythorpe—within a few miles. Doubtless these two clubs will work together to their mutual advantage.

WAIRARAPA.

Alfredton.—Exhibition of sound films by Mr. N. Lamont, Department of Agriculture. The films, which were particularly instructive, dealt with "Soil Erosion," "The Esk Valley Floods," and "The Life of a Farm Labourer in England." Ten members present out of 23.

WANGANUI.

Bulls.—Further parcels to be sent to members serving overseas, in order that they may be received by Christmas. Report on the first round of the inter-club debate arranged by the Wanganui district committee. Discussion

on the subject for the second round, namely, "That Straightout Grassland Farming is More Economic than Grassland Farming Supplemented with Cropping." The Bulls senior (B) team is contesting this round, and taking the affirmative. There was an attendance of 12 members.

Marton.—Report on first round of the southern zone of the inter-club debate. Report on campaign to enrol new members; circular prepared by secretary read and discussed. Arrangements for annual debate. Distribution of copies of Bulletin No. 1, issued by the Soil Conservation and Rivers Control Council, entitled "The Menace of Soil Erosion in New Zealand." Five new members enrolled. Talks by club members, as follows: "Using Motor-car Generators as Battery-chargers" (M. F. Gray); "Hill Country Farming" (H. G. Stewart); "Hill Country Ploughing, etc." (G. R. Gower). There were 19 members in attendance out of 29.

Ohakea R.N.Z.A.F.—Dinner at the Criterion Hotel, Bulls, to which members of the Bulls Club were invited.

SOUTHERN HAWKE'S BAY.

Ballance.—As announced last month, this club resumed activities after having been in recess for over two years. The officers elected (not published in the last report) were as follows: Advisory president, Mr. J. Eising; chairman, Q. Holdaway; secretary, L. A. Sinclair; treasurer, H. Ebbett. This club has good prospects, and shows every sign of a successful revival.

Dannevirke.—One new member enrolled. Hearty welcome given to Keith Bateman, former club secretary, at present on furlough from the Pacific. K. Lamert appointed as delegate to the A. and P. Society. Wording for brass plate for centennial trees decided upon as follows: "N.Z. Centennial 1940. Trees planted by Dannevirke Young Farmers' Club." Short talks competition continued by the following: J. Loughlin ("Grafting Trees"); H. Allardice ("Footrot"); A. Severinsen ("Bee Keeping"); M. Simmonds ("Bacteria"). The secretary, Mr. J. L. Sunderland, gave an account of his trip to Timaru to attend the annual general meeting of the federation; he reported on the meeting, and described the visit to a linen flax factory and other matters of interest noted on the trip. There were 36 members present.

NORTHERN HAWKE'S BAY.

Meeanee.—Routine matters of business attended to: insurance on hall, etc. Financial position investigated; competition to be arranged to raise funds. Discussion on future programme of activities. Further officers elected: Vice-chairman, S. Parsons; treasurer, W. J. Puddle; auditor, Mr. C. M. Oliver. A working committee was also appointed. Nine members present out of 19.

Wairoa.—This club has been in partial recess for some time past, holding the annual meetings only and electing officers; no activities have been undertaken since May, 1942. A meeting has recently been held, at which it was decided to resume activities. Those present included Messrs. A. C. Delatour (advisory president), Humphrey Bayley (president, A. and P. Society), R. G. Watson (club chairman) and 15 club members. Mr. Bayley assured the meeting of the support of the A. and P. Society, and placed his property at Taehanui, together with his Romney sheep and Aberdeen Angus cattle studs, at the club's disposal for a field day. Mr. Paul Jessep, a member returned from overseas, thanked the club for keeping up the supply of "Journals of Agriculture," which were looked forward to keenly by the lads overseas. Three other members returned from overseas were present, and two new members were enrolled. Arrangements were made for a further meeting in the near future. We wish this club every success in its undertaking; those associated with the Y.F.C. movement will doubtless recall that the Wairoa Club held pride of place before the war, with a membership roll of 125.

TE KUITI.

Paewhenua.—Club debate, the subject being "That Horses are a Better Proposition on a Farm than Tractors." Speakers, L. McIvor, R. Miller, R. Disher (negative), F. Thomas, C. E. Heena, G. Morris (affirmative). There were 20 members present out of a total of 21.

WAIKATO.

Cambridge.—Arrangements made for a "Welcome Home" dance to members recently returned from the Pacific. Dr. McMeekan to give a lecture on "Artificial Insemination and Herd Improvement"; proposed to make the occasion an open meeting and invite members of the Farmers' Union and the Veterinary Club. Pte. J. D. Wallace welcomed back to the club from overseas. Mr. C. Wallace, of the National Pig Council, gave an interesting and instructive lecture on "Pig Husbandry." Twenty-five members present out of 60 (the latter figure includes 10 members still overseas). At a recent field day Mr. Bowan, veterinarian, gave a post-mortem on some cows; this took place at J. D. Wallace, Ltd.'s works; 20 members were present. At a previous meeting a report on a recent dance revealed a profit of £8 10s. 10d.; it was proposed to send further parcels to members serving overseas. Talk by Mr. G. Walsh on "The Economic Standing as Regards the Rural

Status." Twenty-five members attended out of 60.

Okoroire.—One new member enrolled. Decided to appoint an auditor. Lecture on "Fencing" by Mr. G. Coates, an advisory member. Twenty members present out of 31.

Tahuna.—Officers elected at annual meeting: Advisory president, Mr. G. R. White; chairman, A. Stewart; secretary, A. L. Hopper; advisory members, E. B. Elliott, H. L. Taylor, and D. Wade. Three new members enrolled. Decided to form a boxing club, necessary items purchased. Twelve members present at the meeting. We are looking for further news from this club.

Te Awamutu.—Members stood for a few moments in silence as a mark of respect to Sgt. G. Terry, a former member who has lost his life overseas. Decided to hold a field day at Ruakura. Arrangements for club dance. Mr. R. J. Sheaf, of the Auckland Herd Improvement Association, gave an interesting address on "Sire Survey Procedure; Artificial Insemination; and Lifetime Records of Dairy Cows." Twenty-nine present out of a total membership of 50.

BAY OF PLENTY.

Whakatane D.H.S.—Recent activities include a lecture given by Mr. N. Carter on "Stock-judging"; a stock-judging competition with the Waimana Y.F.C.—won by Whakatane; and a visit to the local slaughterhouse, where a demonstration was given by Mr. Moeke. There were good attendances at all of these activities.

AUCKLAND.

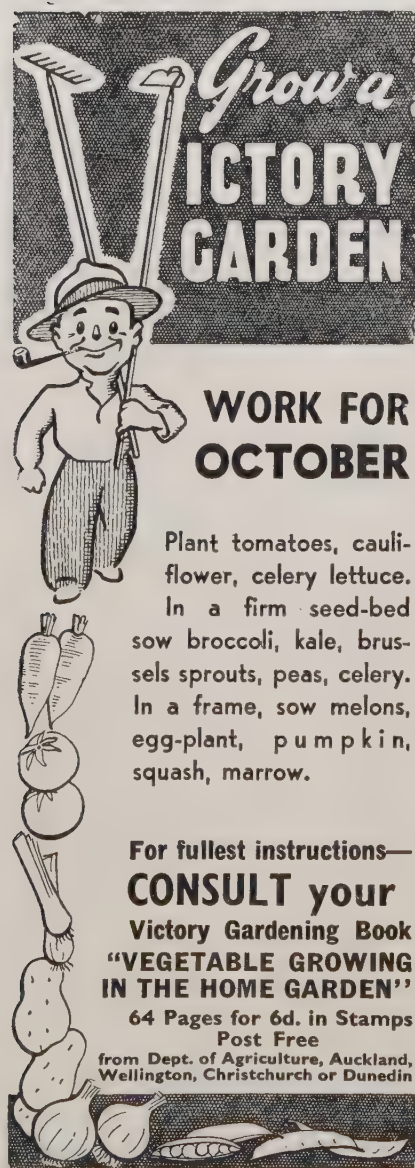
Franklin.—As reported last month, this club has recently resumed activities after being in recess for nearly three years. The following officers were elected at the meeting: Advisory president, Mr. R. Franke; chairman, R. W. Legg; secretary, C. C. Upton. It is hoped to be able to report further in next month's notes.

Pukekawa.—General discussion on the future activities of the club. Decided to hold a field day in conjunction with the school calf club. The social committee to be made responsible for the club's finance. Team selected to take part in a basketball tournament to be held in the near future. Mr. F. S. Atcheson, chairman of the Auckland Y.F.C. council, was present, and addressed the meeting on "The Y.F.C. Organisation." The speaker dealt with all phases of club work and offered some sound advice on activities, etc.; he spoke for over 50 minutes, and his talk was fully appreciated by all present. Attendance of 15 out of 17.

Methven Y.F.C. Dog Trials

Mr. A. A. Grigg, secretary, Methven Y.F.C.

THE Methven dog trials were held this year on Mr. R. J. Low's farm, Mr. G. J. Foreman acting as judge. The results were as follows: Class 1, Long Pull and Hold: A. Molloy's "Tip," 38 points, 1; J. Watson's "Darkey," 36 points, 2; T. Grigg's "Roy," 34 points, 3. Class 2, Driving: A. Molloy's "Tip," 49 points, 1; Ian Wilson's "Scott," 47 points, 2; D. McLaughlin's "Glen," 41 points, 3. The club's silver cup for the most points in the two events was won by A. Molloy; the trophy for the best command of a dog was awarded to A. McKay; and the trophy for the youngest competitor was presented to T. Grigg.



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THE GOOD NEIGHBOUR

HALLOWE'EN

Last night I went to a Hallowe'en party. Although I had not been in the locality before (my friends having moved here only a few weeks previously) I had no difficulty in finding the house, for, seated grinning on top of the gatepost was an enormous jack-o'-lantern made from a hollowed pumpkin and lit by the glow of an electric torch. Other pumpkin faces looked down from various vantage points in the hall, and over the door leading into the lounge two broomsticks formed an archway. The walls were panelled with black cats, hobgoblins, bats, and other appurtenances of witchcraft, while above the mantelpiece there was a harvest frieze depicting a full moon shining upon the "fruits of the earth." For Hallowe'en is not only the time when witches and mischievous spirits are abroad, but is also an occasion of thanksgiving for the bounty of the seasons.

We indulged in all the usual Hallowe'en pastimes, including bobbing for apples (a rather watery occupation, and one in which good clothes are definitely a handicap!); ghost stories recounted in sepulchral tones and accompanied by weird sound effects, so that chills chased up and down our spines; and before the lights went on again a guessing competition wherein a number of objects were passed round, the sole means of identification being by touch. It was rather fun viewing the different articles afterwards and finding how frequently our guesses had been wide of the mark.

At suppertime each guest was presented with a favour—quaint animal shapes cut from coloured paper, miniature brooms of dried grasses fastened to smooth twig-handles, or little wise-eyed owls fashioned from pine-cones. Afterwards we repaired one by one to a dim, cave-like alcove, where our hostess, in a pointed black hat and voluminous cloak over her scarlet skirts, read our fortunes from the cards as an additional proof of her versatility. Altogether it was a most entertaining evening.

As I went home I fell to pondering on the old superstitions: for instance, at this time of the year it used to be considered dangerous to go out alone, especially if you were no longer youthful. Another belief was that children born on Hal-

lowe'en were endowed with supernatural gifts. Though we no longer give credence to such primitive ideas, I wonder if we have really progressed as far as science would have us believe. This is the age of the machine, due to man's skill and inventive genius in the laboratory and workshop. Would that our spiritual development had kept equal pace. Too many people to-day are a prey to fear—"fear of the unknown, fear of disaster, fear of evil. Fear always lurking in the mind can become a habit, a bad habit." The power of thought can either help or hinder us in this regard. As Sophocles, that famous poet and dramatist of ancient Greece, once said: "Thoughts are mightier than strength of hand." If our thoughts are turned inwards most of the time, our fears are magnified till we become obsessed by them. But let us think about others instead of ourselves and be concerned for their welfare; let us overcome our hesitancy and anxiety by decisive action; let us, instead of seeking escape, DO the thing we fear—and we are well on the way to surmounting our difficulties and attaining a richer and more effectual life.

This is where we womenfolk have such a big responsibility. To the mother is

entrusted not only the care of the child's physical needs, but the greater task of disciplining his character and training him for worthy citizenship. If we are to be faithful to that trust we must cultivate in our children the positive qualities: cheerfulness, tolerance, generosity, initiative, and, most important of all, fearlessness. The courage to strive, to battle and endure, the courage that is "the footstool of the Virtues, upon which they stand," is founded in "the nurseries of home."

Mary

Weather Lore

When the wind is in the east,
'Tis good for neither man nor beast;
When the wind is in the north,
The skilful fisher goes not forth;
When the wind is in the south,
It blows the bait in the fishes' mouth;
When the wind is in the west,
Then 'tis at the very best.

—Traditional.



Back

TO HIS EASY CHAIR

Many times during the din of battle he has dreamed of this day, when he will stretch his feet before his own fire once more and return to the comforts of home. And Onehunga Blankets, which have kept him warm on service, will be on his bed to ensure him a well-earned rest.

Swinging slowly from war to peace production, Onehunga Blankets are now available in small quantities for civilian needs. Enquire from time to time at your usual dealers until you are lucky enough to invest in Onehunga quality.



ONEHUNGA

ONEHUNGA BLANKETS — AIR-CELL BLANKETS — ONEHUNGA
WOOLLENS & TRAVEL RUGS. Distributors: SARGOOD, SON & EWEN LTD.



Handy Home-made Kitchen Measure

WARTIME food shortages and the advent of new foods like dried eggs and household milk mean that the housewife has to try her hand at many new recipes. Good results cannot be expected unless the ingredients are measured out accurately.

Wartime shortages, however, also extend to kitchen equipment, and many households are unable to obtain proper scales or measures. Following out recipes by guesswork or by using cupfuls or handfuls as measurements is liable to lead to disappointment. This can be avoided if a handy kitchen measure is made from a 2lb. jam jar as described in this article. Housewives will find the measure saves time and labour and avoids waste.

Instructions

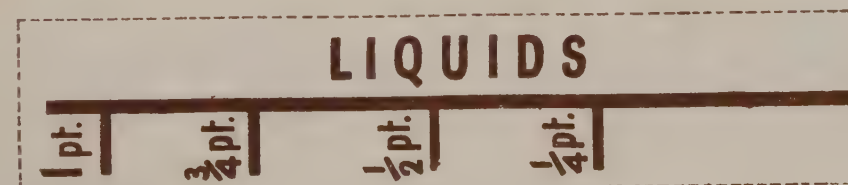
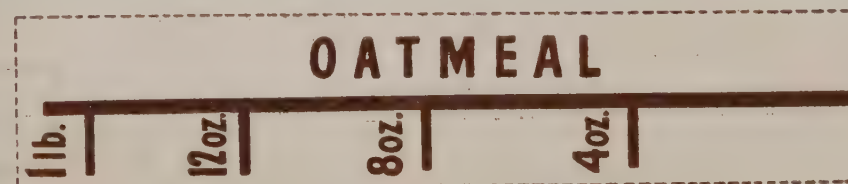
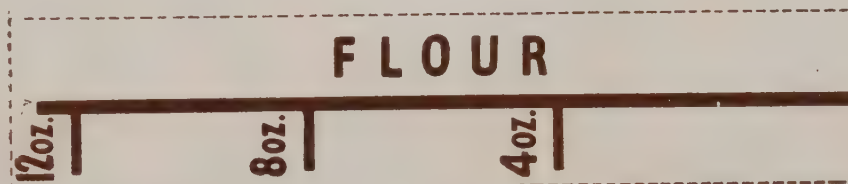
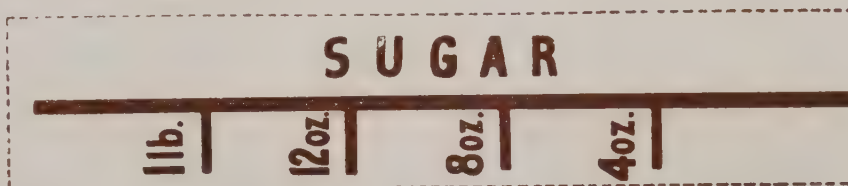
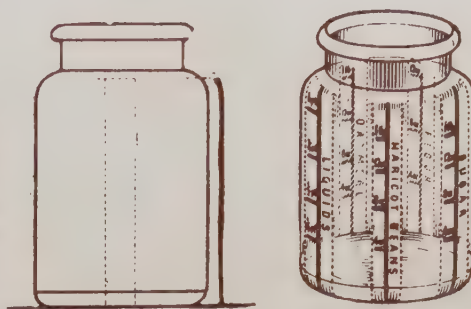
You require a 2lb. glass jam jar, a small quantity of good sticking glue (waterproof type, if possible), and a small quantity of varnish (when available). Carefully cut out the measure strips reproduced here. Glue these to your jar at regular intervals so that you get a clear space between each pair of strips. Be very careful that the bottom of your strip is level with the base of the jar—in fact, before sticking down it is wise to see that the end of the strip touches the table. When you have the strips in position lift the jar and press the lower end of each strip closely on to the jar. You now have a complete measure which can be relied upon. If you use a waterproof glue and varnish the surface of the strips, you can use the jar for measuring liquids as well.

Here is another way to make your jar suitable for liquid measures, if you are handy with a small paint brush. Stick your strips on as above, but using paste or non-waterproof glue. Then carefully rule a line down the side of your paper strip in white enamel, marking at right-angles the measure marks, and then in long hand putting in the quantities, 4oz., 8oz., 12oz., etc. When the paint is quite dry immerse the jar in water and the paper strips can be carefully removed. This will leave the white enamel markings, which will be impervious to water when you wish to wash the jar.

Note: When measuring other than liquids place dry product into the measure, then gently tap the bottom of the jar on the table until the contents are level with the measure mark.

Spoon Measure

Where spoon measures are required it is very necessary that





*Stop
sabotage*



LET FRIGIDAIRE STAND GUARD FOR YOU

Once upon a time, when "there was plenty more where that came from," perhaps you could afford to be philosophical about Waste. Today, when the call is for ever-increasing production, it's a different story and it is vitally important that your own family's share of the precious foods you produce, is not only used to the full but kept in the best possible condition.

Only Frigidaire can give you the fullest measure of adequate food-protection and you will be amazed just how much can be stored away . . . and thus saved.

Fill in this coupon today and take the first step to eliminating food waste on the farm-front. You'll also ensure that your family's food is kept fresh, wholesome and appetising.

FRIGIDAIRE

DIVISION OF GENERAL MOTORS NEW ZEALAND LTD.

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Please send me full particulars of Frigidaire
Models by return mail.

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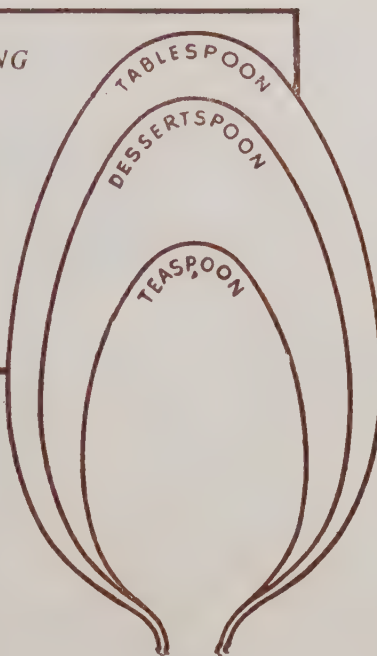
ADDRESS

.....

.....

HERE IS YOUR GUIDE SHOWING SPOON MEASURE

	Weight	Spoon Measure
Cocoa ...	1 oz.	2 level tablespoons
Custard powder ...	1 oz. =	2 level tablespoons
Dried beans ...	1 oz. =	1 level tablespoon
Dried milk ...	1 oz. =	2½ level tablespoons
Flour ...	1 oz. =	2 level tablespoons
Lentils ...	1 oz. =	1 level tablespoon
Mashed potato ...	1 oz. =	1 level tablespoon
Oatmeal ...	1 oz. =	2 level tablespoons
Rolled oats ...	1 oz. =	4 level tablespoons
Syrup and treacle ...	1 oz. =	2 level tablespoons
Sugar ...	1 oz. =	1½ level tablespoons



a standard type should be used. Reproduced here you will see oval-shaped diagrams in three sizes. They represent the outside measurements of the recognised standard-size teaspoon, dessertspoon, and tablespoon. Place your own spoons over these patterns and they should fit exactly. You can then safely use these for your smaller measures. For a level spoonful fill the spoon to edge level and smooth off any surplus with a knife. This will give you accurate measurements. A heaped spoonful is roughly twice a level spoonful.

Issued with the approval of the United Kingdom Ministry of Food.



Mary's at - Home -



I FIND that to tackle some job which one knows should be done, but which has been pushed to one side—in my case it is usually mending of some kind—leaves such a virtuous feeling afterwards. Sometimes I take a few minutes for a special game with my children. Who can be unhappy when a child laughs in a game (and games are twice as much fun when an adult joins in).—“Rosemary.”

AS I look at the bulbs coming through, the primroses showing their creamy faces, and shrubs and plants springing into life, I think, “Here is promise that the winter is over. What am I worrying about? I must look on the bright side and have more faith, and things will come right.”—“Spring.”

HOW I wish you could see all our plum trees and ornamental shrubs in full bloom. Even the kitchen duties are lightened, for from the windows I look out to the orchard, which is bordered by these plum trees. It

really is a glorious vision. In the orchard, too, there are a few sheep with young lambs—spring has really come.”—“Kahikatea.”

ON a wet day I let the kiddies have a tea-party by the fire and I lose myself in my favourite book, “A Lantern in her Hand.” After having lived with the heroine for a while and gone through some of her trials and anxieties and hardships as she faced life in the western prairies of America, I realise that I have riches untold to bless my days, and I am thankful for a life so full.—“Farmlander.”

I HAVE always been fortunate in possessing a large garden. There is healing in a garden, and life and music, and good solid comfort in gathering flowers, fruit, and vegetables which someone less fortunate is always glad to accept. If the time happens to be early evening the birds seem very near companions as they chatter before going to bed.—“Then and Now.”

I LIKE to give one room a real facial and improve or alter some aspect of it—perhaps rearrange the pictures or the furniture, or wash and iron the cushion covers (and how often the kitchen ones seem to need it!) Sometimes I rummage out a disused article of clothing or piece together scraps of material and out of them fashion a wee garment. I do not attempt anything big. Sometimes I embroider a design on a garment which was plain before. These things give lasting satisfaction to me as they are truly constructive.—“Teragram.”

THE weather has been so mild this past week that I have been tempted to garden. Now if only the weather-man will continue to be lenient and sparse with his frosts, all should be well. A good neighbour has given me some dahlia tubers, so it will be grand watching their growth to maturity.—“Roundabout.”

JOURNEY BY NIGHT.

*The Great Bear points to the north-east;
How white the fields stretch and how vast,*

*Lying a foot deep in crisp snow!
It's cold and I have no cloak;
In the night the candle dies;
Ghost-fires flicker in the dark;
Sprites show a foot,
And then jump, groaning, to my side.
Though not afraid,
I loathe their malformed ugliness,
And when the dawn breeze comes to help
I'll yoke my horse and make for home.
—Sung Li-shang.*

READING the letter by “Roslyn,” Dunedin, reminded me of the disappointment I had when I was small and let a string of tiny beads that my aunt had given me to thread slip down a crack in the boards of our verandah. I tried to find a loose board to see if I could get my arm underneath and reach them. Then I went to my mother and asked her to get someone to lift the boards, since if those beads had been gold they could not have been more precious.—“Fintry.”

I REMEMBER hearing a talk once where the speaker said that we should periodically stop, get up on a hill-top mentally, and look down at the path we have trodden so long and see just what we've made of ourselves. I think that's a grand idea. But we've got to be really honest in our stocktaking. I've been jolted myself into serious thought over this when I occasionally hear a well-meaning, quite lovable person say: “I do believe in this, I do think we should do that,” and yet sadly enough, in spite of *thinking*, they don't do it.—“Tigety Boo.”

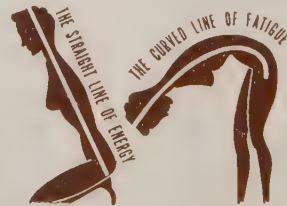
THE STRAIGHT LINE OF ENERGY



THERE'S A KNACK IN IT

So much has to be done. You go all out — and in no time you're 'all in'. Save your strength. There's a knack about most labour which once acquired lightens the work no end — and actually improves the figure. Stooping over with a curved spine simply invites fatigue. Remember, the straight spine's the strong line, whether you are standing, kneeling, bending or sitting. A slumped chest is cheated of its full supply of oxygen, cramped digestions can't work, strained back muscles develop aches. But . . . straighten that spine, pull in that chin, tuck that rear under like a spanked puppy (and when you bend, bend from the hips like a native woman, as nature intended you to do), and you can hoe in to your heart's content. You'll finish only pleasantly tired, not dragged down with fatigue and exhaustion. And — it's done the figure-work of beauty-exercises galore!

Berlei's five fundamental types and their variations came from the need for good posture, for only with good posture can you have better poise, carriage, health — and a beautiful figure. And only in your right type Berlei can you feel how wonderfully right Berlei is when they say "your Berlei is the fundamental foundation of good posture". Do keep on trying for your right type garment — it's vital.



Are You Superstitious?

ARE you superstitious or are you one of those happy-go-lucky folk who laugh at such beliefs, dismissing them as sheer nonsense and never, never stepping aside if a ladder happens to be in the path, but making a point of passing directly underneath, instead of going round it like the majority of people?

PERSONALLY, I can never see why the wearing of a green dress renders me any more liable to attract ill fortune than when I am garbed in blue or red—in fact, green is a favourite colour of mine where my wardrobe is concerned. As for any evil ensuing from filling my vases with the feathery golden loveliness of wattle—well, sufferers from hay-fever are the only ones who might have just cause for condemning my action. And what possible harm could result from my first viewing the new moon through the window-pane? I'd be much more likely to catch cold if I stood about in the chill air outside awaiting for the pale, slender crescent to appear. Remember the old nursery jingle: "See a pin and pick it up, all the day you'll have good luck"? It may be a trifle more appropriate in wartime when pins are in short supply, but handy little articles though they are, a needle and thread gives much more satisfactory results, in my estimation.

When you were a child did you ever go to bed on the last night of the month determined to say "Rabbits!" first thing on waking in the morning? The custom probably originated from the belief in eastern countries that the moon is inhabited by a rabbit or a hare who pounds with pestle and mortar the elixir of immortality. This rabbit is always kind to children, girls in particular, and many a mother in those parts slips a paper rabbit inside the lining of her daughter's shoe so that the wearer will make a happy marriage.

Black cats are universal bringers of good fortune, especially in China, where they are grandiloquently styled as "Protectors of Silk-worms." The title is based on practical merit, however, since rats are notoriously fond of silk-worms, and what better vanquishers of rodents than cats? Their popularity dates back to very early times, and there is a story concerning a certain Empress in the eighth century who was so fond of cats that she taught them to drink out of the same bowl as her pet parrots—a proceeding which did little towards maintaining tranquillity in the palace! Actually I am a trifle prejudiced against the species myself, but that is largely due to the nightly depre-

dations of a lusty, dark prowler which invariably leaves deep paw-marks all over my freshly-dug flower-beds and makes the wee sma' hours hideous with his howls.

Foxes and badgers are always associated with mischief and malicious intentions, though occasionally they redeem their misdeeds by curing coughs and colds; but the virtue of the canine race is such that the word "dog," written on a child's forehead, acts as protection against any injury a fox can devise. No baby in the Orient thinks of crying if a little red bag containing dog's hair be attached to the back of his garments; and the inscription of the noun "puppy" on the upper part of his person will ensure untroubled slumbers. Talking of sleep, it is considered good to dream of bats, tortoises, or turtles, and even snakes and bears indicate happy tidings, though if you see those industrious creatures ants in your dreams you will be exceedingly unlucky.

The reverse of our rhyme, "One for sorrow, two for joy," obtains in China. There a lone magpie is regarded as propitious; and a duck squawking at a passer-by and crows cawing and a hen flying on to a roof are all bad omens. The ancient Maori also attributed unusual qualities to various birds, the New Zealand owl, or more-pork, foretold disaster, as did the sound of a robin calling on the left, but to hear the note of a robin on the right hand side was fortunate in the extreme and if the dainty *miro-miro*, "the bird-of-love," alighted close to a person it signified that someone was willing loving thoughts in his direction and wishing him well. A certain kind of lizard was the most ominous sight of all, for it was the sign of death and only the services of an expert maker of incantations could avert the catastrophe.



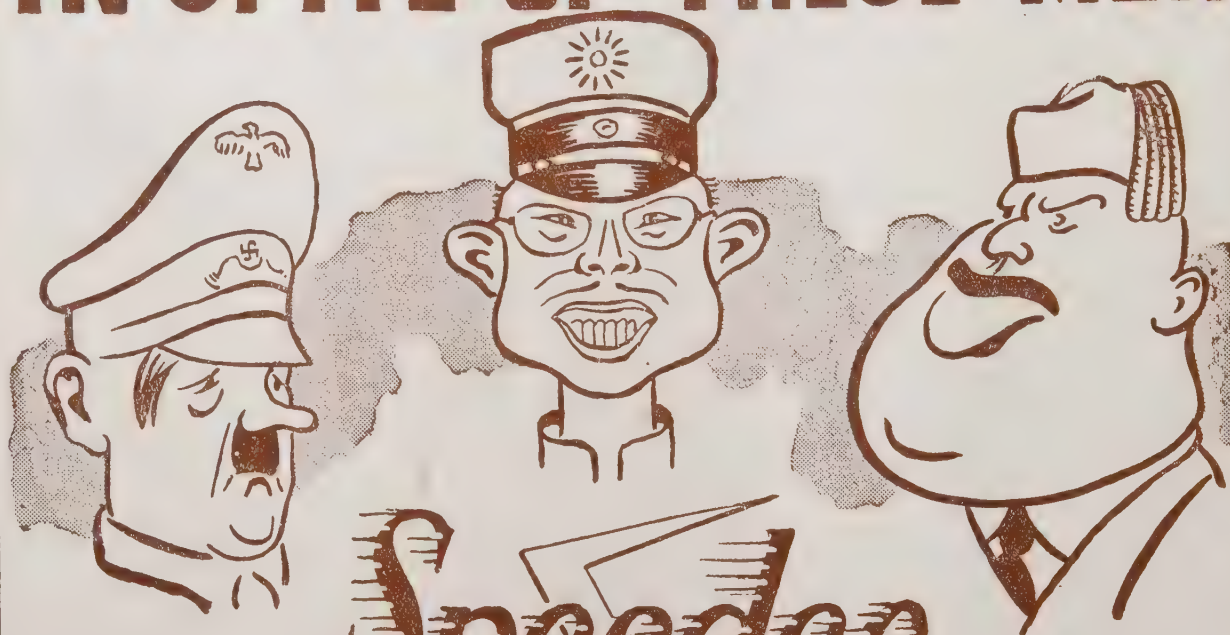
When a person asserts that he has never experienced a serious illness or had an accident while driving you will often hear him quickly add the phrase, "Touch wood." This reluctance to tempt Fate has its parallel among the Natives, who dislike even mentioning the game they hope to secure in case it may overhear and escape. Likewise, when searching in the forest for edible roots they never refer to them by their proper name lest their labours prove unsuccessful. (Golfing enthusiasts and fishermen ought to be thankful such a prohibition does not apply to their activities, while as for victory gardeners, what would the poor souls do if they couldn't boast about the size of their carrots or their remarkable potato crop!) The Maoris held no brief, either, for would-be house-owners who changed their minds—"to excavate a house-site and then abandon it is extremely unlucky: we have wounded the Earth Mother without just cause." Housewives accustomed to doing the family knitting and mending during the evenings will doubtless be surprised to learn that no *wahine* would dare to continue her weaving after the sun had set—no chance of staying up a bit later than usual to finish her new skirt in time to wear at the tribal gathering on the morrow!

The vogue for tikis and other mascots, including the wearing of tiny animal charms on fobs and bracelets, has its fashionable counterpart among dwellers in the East, amulets being the most popular bestowers of good luck, while tigers' claws and figures of gourds and unicorns ward off sick-



Manufacturers: J. T. NORTON, LTD., Lyttelton

IN SPITE OF THESE MEN



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Remember, there are ample stocks of Speedee elements for Speedee Jugs. 9/6 is the approved official price (10/6 if fitted). If your dealer has no Speedee Jug Elements, communicate with us, supplying your dealer's name.

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ness. Nearly every householder insures his family against misfortune by adorning doorposts and walls with the characters for longevity and happiness or fire, wind, and thunder written in black or vermilion on thin strips of paper. Sprays of peach-blossom arranged near a bed give added protection to the sleeper. But should ill health befall despite all these precautions, then the paper charms must be burned and the ashes mixed with tea or water and swallowed by the patient. A very effective preventive of malingering among the young, I imagine!

I have sometimes wondered why it should be deemed any more unfortunate to break a mirror than a piece of a cherished dinner service, and I recently discovered that according to Chinese ideas it predicts a separation between husband and wife. And as a mirror hung above a doorway is the best way of keeping ghosts out (the spectre being so frightened by its own reflection, apparently, that it turns and runs) it is quite feasible that the breakage thereof may have dire consequences.

We throw salt over the right shoulder when it has been spilt accidentally; the eastern seamstress sprinkles it intentionally not only once, but thrice, over the new garment she is making. One of the methods of determining whether a girl will be a good needlewoman or not is to set a bowl of water to collect the dew on the night preceding the seventh day of the seventh month. At noon of the following day the aspirant drops a straw in the dish, and if the straw looks like a needle in the water then she is sure of becoming accomplished in the domestic arts.

Sneezing betokens not only the likelihood of a chill, but the additional calamity of scandal being spoken about the person sneezing. All those graceful pagodas and dragon-roofs and half-moon bridges that so delight the traveller's eye were not built in this style merely to gratify people's aesthetic tastes—curves hinder the advance of unfavourable influences which would otherwise be greatly assisted by straight lines both in architecture and landscape.

The Chinese have their share of weather prophets, too, as evidenced by the following proverbs:—"When the tiger roars the wind rises"; "A stone lion is not afraid of rain"; "Lightning in the east—fine weather; lightning in the west—shower after shower; lightning in the south—continuous rain; lightning in the north—a gale from the south." The latter item is rather like the current forecast whenever I make plans for a picnic!

Life used to be a leisurely affair in China, for they set aside a number

of days each month as being unlucky for any undertakings. On these dates "you must not start on a journey, change your dwelling-place, plant or sow, repair your house, or purchase landed property"—what an opportunity to take a holiday with a perfectly clear conscience. As a special concession to housewives they were advised not to scrape their saucepans on the 1st and 15th days of the month. It was also regarded as ill-omened to sing in bed (no ban on vocal per-

formances in the bath-tub, you'll notice!)

So whether you are superstitious or not, may I invoke for you the Chinese wish—"May a hundred joys come all at once and a thousand good omens gather like clouds. May your old age be like the evergreen pine and its fragrance like the flower of the red camellia."

"The Laughing Ghost"

I WONDER how many readers know that the author of "The Laughing Ghost" is a New Zealander. Tall, slim, and attractive as one of her own heroines, Dorothy Eden has always possessed a distinct flair for storytelling and her work appears frequently in overseas magazines. Her first novel—a romance—had the early colonising days in our own country as a setting, but in her new book she has chosen the green countryside around one of England's historic mansions for the major part of the action. Link together a jewel theft; the crafty machinations of a pair of criminals; smugglers and secret passages; an eccentric will involving the manorial estate; and last, but not least, a ghost that laughs, and you have some idea of the diversity of events encompassed by the plot.

Miss Eden is particularly skilful in conveying a sense of atmosphere. She depicts with rare charm the beauty of the vast, centuries-old home of Carstairs, with its lawns and fountains and quiet shrubberies, and her description of the dark, bat-haunted caverns leading from the cellars to the sea is so realistic that one can almost smell the mustiness of the dungeon where the lovely mistress of the manor was imprisoned nearly 200 years before, only to vanish mysteriously and become lost in the maze of winding passages. The macabre scene in the cave where the rising tide puts finis to the thieves and their plottings is most dramatic. A discovery concerning the lost Lady of Carstairs whose laughter echoes through the house beneath which she perished, and the escape of the two principal characters from the same fate as befell the Laughing Ghost make such exciting reading that the average person cannot bear to put the book down until the last page has been reached.

SUPERSTITION.

Danger is the very basis of superstition. It produces a searching after help supernaturally when human means are no longer supposed to be available.

—B. R. Haydon.

Ghost Story

HERE is a Ghost Story guaranteed to create a really spooky atmosphere at any Hallowe'en party. The audience should sit on the floor in a semi-circle, and when the lights have been dimmed the Ghost (suitably hooded and attired in flowing white draperies) recites his tale in a hollow voice and hands the various relics to the person on his left who, in turn, passes them to the next player, and so on, till everyone has touched the departed one's remains. The narrative runs thus:—

*It is the truth, and not a myth
That once there lived a man named Smith.
Alas! it was his bitter lot
To murdered be quite near this spot.
(Ghost groans and pauses).*

*Now we have with us his remains,
So first I give to you his brains
(Wet sponge).*

*Now next I pass, as you surmise,
The murdered victim's mournful eyes
(Skinned grapes).*

*And now your shuddering touch reveals
The teeth with which he ate his meals
(Peanuts).*

*And next your startled nerves prepare
To touch the late lamented's hair
(Far).*

*His hand no longer yours can hold,
Alas! it now in death grows cold
(Kid or rubber glove filled with wet sand).*

*And so that you'll no longer grieve,
His honest heart to you I'll leave
(Skinned pear).*

*And now his ghost all in white
Is standing in your midst to-night.
(Ghost rises, and stands in centre).*

*Er, he departs with woeful groans,
Just list the rattling of his bones.
(Exit Ghost).*



Samples of the new baking powders based upon pure food phosphate were sent to 26 cookery experts in all parts of the Dominion. They were invited to both use and mis-use it, and report their findings.

The sum total of their opinion was that as well as being better, the new phosphate baking powders are foolproof. For instance, when as much as 25% more than the correct amount was deliberately used in tests, the results were still successful, and there was none of the after-taste usually associated with an overdose of baking powder.

Without exception, all these experts were enthusiastic in their praise. They got better aeration, more even texture, the baking kept moist longer, but above all they were thrilled that they could

leave the baking after mixing in the powder for long times without losing any rising. Phosphate Baking Powders don't "act" till they are in the oven.

AND THERE'S PHOSPHATE FOR HEALTH

New Zealand soils are deficient in phosphate, which is so essential for health. That is why Phosphate Baking Powders are more than a contribution to cooking, they have a real and vital health value too. How to get a Phosphate Baking Powder? That's easy. All the best known brands are using Phosphates as the rising agent, and if you will look on the reverse side of the label you'll find "Phosphates" listed among the ingredients. That's your guide to Better Cooking . . . Better Health . . . and Better Baking Powder.

Pure Food Phosphate for baking powder manufacture is a product of Albright & Wilson, and is distributed in New Zealand by Imperial Chemical Industries (N.Z.) Ltd., 16 The Terrace, Wellington.

"Strange Dreams"

DREAMS of disaster, of prophecy and warning; dreams of strange planets and peoples, and peculiar powers bestowed on the dreamers—how I wish I could devote twice as much space to your accounts of the extraordinary experiences you have undergone while asleep. Many of these dreams foreshadowed actual happenings in real life, giving rise to all kinds of theories concerning the interpretation and significance of dreams.

First prize goes to "Alix," Wairoa, for her excellent treatment of the subject, and "M", Feilding, and "Mrs. R. V. Winkle", Oxford, tied for second place. Highly commended: "Golden Kowhai", Kati-kati, and "Anon.", Dunedin.

First Prize

THROUGHOUT the ages theories concerning the nature and origin of dreams have been advanced, from prophetic significance to a secret code as set forth in "dream books." It was not until this century that a scientific method of interpretation was set forth, based on psychological analysis of the mind of the dreamer, by Professor Sigmund Freud, of Vienna. This theory, now generally accepted, is that dreams represent in a distorted or disguised form the fulfilment of wishes, desires, and urges that are not acceptable to the conscious personality and are therefore buried in the subconscious. Some dreams appear in a distorted manner and are full of horror, some are pleasant, some vague and difficult to recall to memory on awakening. Others recur at frequent intervals over a period of years and it is this type of dream which I recall.

There are three dreams which stand out vividly in my memory, not because they are spectacular, but because they recur at frequent intervals—always the same dream, the same setting and ending. For many years, at long intervals, I have had this dream. I am enclosed in a locked room with a spider, a huge, hideous spider the size of a bird, and like a bird, it can fly. Terrified, I try to escape it, and when the horrible thing has me almost paralysed with fright and has at last pounced upon me I always awake shaking with terror and glad to realise it was only a dream. A fright with a katipo spider as a child is probably the subconscious reason for this dream.

The second is a pleasant dream, occurring every week or two. It has persisted since the wool shortage when I had vainly tried to procure some blue wool. Always in this dream I see fascinating window displays of coloured wools, shops and shops of them, and I flit from one to the other trying to decide which shade I shall

have, as there is never any blue to be seen. The purchase completed I wake—to reality and disappointment. Since actually purchasing some blue wool recently I have had no further dreams of wool displays.

Number three is a dream I cannot fathom. The years roll back to 1930 and I have said good-bye to my sweetheart, who has gone back to his home town after having made the final arrangements for our marriage two weeks hence. I look in vain for a letter from him; days and weeks go by—the weeks turn into months and the months into years, and like Miss Ainslie in "Lavender and Old Lace," I begin to realise that my lover is never coming back to me, and I put away my ring and prepare to face life as a disappointed old maid. Then I waken to the blessed realisation that he who seemed so fickle is quietly sleeping nearby, whilst under the same roof sleep the children born of our love. Probably a psycho-analyst could fathom the why and wherefore of this dream. I cannot.—"Alix," Wairoa.

Second Prize (equal)

THIS account of a strange dream was told me by a friend. Her mother was the dreamer. It proved more than a mere dream—rather, a warning with the given answer. It happened in the early days of pioneering in bush country, when bush fires were more frequent and a very great danger. Mrs. B's home was a tiny cottage in a clearing on a hill-top. One night she dreamed that the bush was afire and they were trapped in their frail house by the flames. She saw herself hopeless: the way of escape closed in too quickly to allow them to pass through. And then she thought of their precious tank brought in so carefully through the bush and not yet placed on its stand. She called her husband; they rolled their blankets round themselves and their baby, crawled into the tank, and pushed it

going. They had a hectic tossing till they reached the bottom of the hill—and safety.

Mrs. B. awoke to the smell of smoke, and found the dream was a reality. For a moment she was helpless, then she remembered her dream—and the tank! "Well," said my friend, "you know that the dream came true, because I was that baby!" "M.", Feilding.

Second Prize (equal)

NO, I had not read myself to sleep with the entertaining pages of H. G. Wells or Jules Verne, nor had I spent the day worrying about wartime shortages. Nevertheless, this is what I dreamed: our local branch of the Women's Christian Temperance Union was having an excursion and a bus had been hired for the purpose. This marvellous vehicle travelled through time instead of space, so my temperate comrades and I paid flying visits to 1840 and 1900 and 1918, then dashed on to 1960 and 1999—a most exciting journey! But the most amusing part of the dream concerns our actions on arrival at each of our various stopping places. We dashed from the bus, rushed to the nearest house, made for a bedroom and rapidly proceeded to rifle the chest of drawers—not for gold or jewels or even souvenirs; the prize was more valuable than that to us poor females of 1944. Have you guessed it? Yes! ELASTIC!—"Mrs. R. V. Winkle," Oxford.

Highly Commended

DREAMS hold a special interest for me, for they have a remarkable way in our family of coming true at unexpected moments. I think this is the most interesting. It has really been a series of dreams, occurring before we receive news of a special friend with whom we have always kept in touch even when circumstances regulated us to mere correspondence. The dreams have happened only since the war began. Jack left for overseas in 1940. After receiving his farewell letter we had no news of him for some months, when his name appeared among the missing in the Greece and Crete campaign. It was then I dreamt we had a long letter from him written in green ink. Shortly afterwards he turned up, having escaped from Greece to Crete, where he was badly wounded. His long letter telling us of his safe return to Egypt duly arrived; it was written in pencil, but the censor's name was scrawled in green ink.

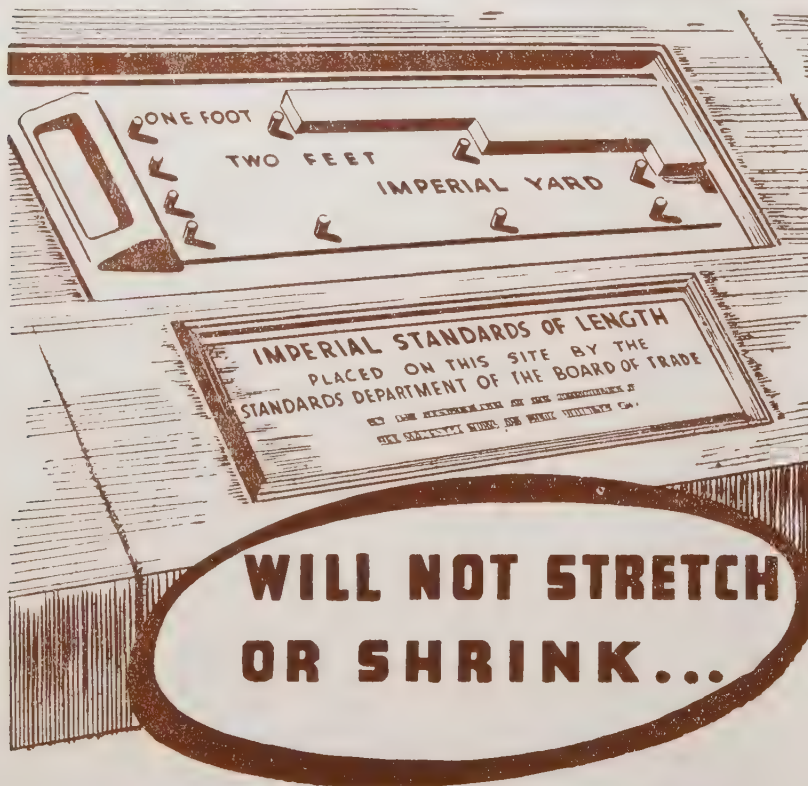
He was in Syria when I next dreamt about him. I thought he'd been ill and with several other boys was coming out of an old concrete building with high windows. They seemed shabbily dressed but were going out into the sun to laze. After the N.Z.

Division joined the Eighth Army again in Egypt Jack was soon reported missing once more, and when news eventually came of him he was a prisoner of war in Italy. His first

lettercard stated that he had been ill, but was glad summer had come and was enjoying the sun. (Recently in the paper there appeared a picture of a p.o.w. camp the exact replica of the

concrete structure of my dreams.) The next dream was just a short flash of Jack silhouetted against the skyline, waving a mute farewell before he disappeared. After the collapse of Italy there was no trace of him and his name was not included in the list of prisoners transferred. Much later he turned up in Germany. For a long time I had no news from him—and no dreams. This week the dream has come again: a clear picture of Jack home once more in New Zealand, very thin and weary looking but quite safe.

Will you believe me when I add that since beginning this entry word has come from a most surprising and unexpected quarter that Jack was well and thrilled at receiving a letter from us, but he had been unable to



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NAME

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J.A.

Two Poems from the Chinese

*Up and up winds the mountain road—
Where does it end?
Down and down runs a chattering brook
As I ascend.
Through leaves' crisp rustle in the wind
A dog barks loud;
I see the smoke of a pine-wood fire
Against a cloud.*

*I rise and dress and wait to greet the moon,
A waning moon, that rises late to-night.
Slowly she creeps above the rugged hill,
And touches first the tree-tops with her light;
The golden wavelets shiver in their sleep;
Faint and more tenuous flows heaven's silvery stream.
I linger till Orion's stars have set,
Then sleep again, and see it still, in dream.*

write. In this strange way dreams have revealed to us his safety.—
"Golden Kowhai," Katikati.

THIS is one of the most beautiful dreams I have ever had. I seemed to be on a hillside, where I saw some beautiful blue flowers. And then I heard an orchestra playing wonderful music—I thought in the dream that it was Beethoven's Fifth Symphony, but I could not remember it when I was awake—and gradually I began to float through the air as though carried on the music. I saw below me a wide, smooth, shining river, and I drifted along this into an inlet which widened into a big harbour and then the music faded away.—"Psyche," Eastbourne.

Highly Commended

WHILE holidaying in my youth I met a young farmer, who became my constant attendant. When I was

going home he asked if he could call in a few weeks' time, as he had something particular to ask me. However, weeks went by, and I heard nothing. I was worried, but decided, as the matter had been left to him, the best thing I could do was to try and forget. Then one night I had a very vivid dream. I dreamt I picked up the newspaper, and read his death notice—everything was there before my eyes, his full name, his age, his parents' name and address. I wakened, crying bitterly. The dream seemed so strange that I told the girls with whom I worked about it.

Later, from a mutual friend, I learned that my farmer friend was lying seriously ill in a country hospital. He had been taken away suddenly, soon after I had gone home. I thought I would write, but when going into work the next morning I found the other girls gathered in a heap reading the newspaper. They looked at me strangely, and one handed over the paper. There before my eyes with the print jumping up to meet me, was that death notice, word for word, as I had dreamed it. There is no explanation I can offer.—“Anon,” Dunedin.

I AM one of those people who have I “recurring dreams.” Mine are not exactly identical, but are always about stones—a lonely hut on a mountain, an exploration trip to the Arctic, a walk up the river, piles and piles of stones, the tranquillity of a great effort over and quiet peace. I always feel happy after one of my “stone” dreams. Not only superstitious people are interested in the meaning of dreams, but eminent scientists as well.—“Bee,” Timaru.

STRANGE dreams are fearsome things. In my student days our psychology professor gave us a lecture on the study he had made of dreams. There is always a reason for a strange dream. It may be something we have been thinking about or a passing scene that made little impression on the conscious mind, but a far greater impression on the subconscious. Inhibitions, frustrated hopes, frights, even those caused many years ago may all cause strange dreams. Recently I dreamed of people standing in a ring and throwing a ball to one another. Each of those to whom the ball was thrown was a friend or relative who had died within the last few years. A school friend who had lost her little son under tragic circumstances had been in my thoughts a lot, and that accounted for the dream.—“Haruru,” Kaukapakapa.

I HAVE proved that if I dream of a lost engagement or wedding ring it always heralds a sudden bereavement in our family circle.—“Pal,” Motukarara.

Competitions

NOVEMBER.

The closing date for descriptions of “A Memorable Christmas” is November 15.

DECEMBER.

New Year's Eve—the time when we review the year that has passed and look forward to the new one now approaching. There are few of us who do not feel some measure of regret for the opportunities we have wasted, our foolish mistakes and inadequacies, and as our thoughts turn to the days ahead the desire for a worthier future is resurgent in every heart like a phoenix rising from the ashes.

How are we planning to equip ourselves for the tasks to come?

“RESOLUTIONS FOR THE NEW YEAR.”

First prize, 10/-, second prize, 5/-.
Last day for entries, December 15.

“MARY,”

C/o “Journal of Agriculture,”
P.O. Box 3004, Wellington.

I DREAMED I was standing on a stone platform and as I gazed about I saw dozens of winding stairways leading up into the mountains which I could see only dimly because of the mists. Presently I heard the sound of weird music and as the mists began to vanish I looked up towards the mountains. I longed to run away, but when I tried to move I found my legs had turned to stone. Strange shapes now began to descend the staircases and now I saw that they were hundreds of little dwarfs dressed in long, flowing robes. They had no hair at all and most of them carried large sunshades and sang loudly. At length the first little man on each staircase reached the bottom and seemingly from nowhere came hundreds of turtles. The dwarfs climbed on to their backs and were carried away to an opening in the mountains. I longed to reach that hole to find out where the turtles and their riders vanished to, and by some miracle my legs suddenly changed back from stone. I entered the mountain and saw a large crater in front of me. Unable to stop I went hurtling forward into it. Then with a bump I awoke and found myself lying on the floor beside my bed! “Land Girl,” Invercargill.

ONCE had a brief, startling dream which was connected with a tragic happening. It was after a picnic on a perfect summer's day. Among the group was a young fellow full of

gaiety and quite the life of the party. We all called him “Andy.” That night I went to bed and dreamed I was out on the hills again, but alone. I seemed to be searching so desperately for someone, and then I found “Andy,” the happy boy of our picnic party, lying strangely still. I called, but he wouldn't answer and as I looked down I saw I was holding bright red flowers in my hands. I laid these beside him—and then I woke up. I could not put that dream out of my mind, much as I tried. Several days later “Andy” was drowned. In my grief I went into the garden for flowers to make a wreath: the only flowers I could find in sufficient quantity were small red dahlias.—“Anne,” Christchurch.

WHEN I was a schoolgirl I had a rather uncanny gift for painfully real dreams. I was at boarding-school in Melbourne at the time and my younger sisters had a governess at home. We lived on the border of New South Wales, where my father had a big sheep and cattle station. One night at school I dreamed that the children and the governess were about to begin morning lessons in the schoolroom when for some reason they elected to study in the dining-room. In my dream I saw them change rooms. They had barely commenced lessons when there was a tremendous crash and they found that the schoolroom chimney had suddenly collapsed and fallen through the old roof on to the very spot where they had been sitting near the fireplace. Two or three days later I had a letter from home describing this catastrophe in detail and the narrow escape of the children and the governess, exactly as I had seen it in my dream. Did I, perhaps, play an unconscious part in their escape? Was I really there in my dream, the unseen agent who made them move in time?—“Sue,” Auckland.

Out in the dark

*Her eyes the glow-worm lend thee,
The shooting stars attend thee;
And the Elves also,
Whose little eyes glow
Like the sparks of fire, befriend thee.*

*No Will-o'-the-Wisp mis-light thee;
Nor snake or slow-worm bite thee:
But on, on thy way
Nor making a stay,
Since ghost there's none to affright thee.*

*Let not the dark thee cumber;
What though the moon does slumber?
The stars of the night
Will lend thee their light,
Like tapers clear without number.*

—Robert Herrick.

PAINS and PILLS

SOMETIMES a pill is a mighty good thing for stopping a pain. At other times it's anything but the right thing. And that goes also for any other form of medicine or drugs. One of the time-honoured remedies for pains and aches and upsets in the abdomen is the taking of a laxative. This may be all right, but on the other hand it may easily be all wrong.

Risks with Laxatives

What is the most important thing from the patient's point of view is the real cause of the trouble. Unless the cause is quite obvious, no one but a doctor can detect the reason for the complaint. Appendicitis is a case in point. People who give laxatives to relieve suspicious pain in the abdomen are asking for trouble for the patient, no matter how well-intentioned they may be. Experience has shown that laxatives given at the onset of a case of appendicitis enormously increase the risk of this disease.

Let's look at some figures in this connection. Among a certain group of 1394 patients whose histories were complete it was found that 402 took no laxatives prior to surgical treatment, while 992 took one or more doses of laxatives prior to surgical treatment. Of those who took no laxatives only one in 80 died as a result of illness; of those who *did* take laxatives one in 13 died; and for those who took multiple doses the death-rate was one in 7. These are actual facts and figures recorded in England, and, more than any amount of talking could do, they bring home the danger of using laxatives when appendicitis pains are suspected.

Guesswork Won't Do

The experience gives tragic emphasis to the danger of self-diagnosis and self-prescribing. And it doesn't apply only to appendicitis. The layman has to remember that doctors are far more skilful and qualified than ever before to diagnose and prescribe treatment for human ailments. Non-medical persons lack both the training and the experience—a diagnosis or a prescription by a non-medically trained person is merely guesswork. And when it comes to looking after the health of our people guesswork simply won't do.

Some diseases lend themselves too readily to self-diagnosis and delay in proper treatment. Diphtheria is one of them. A sore throat—one of the symptoms of diphtheria—is easy to neglect and dismiss as insignificant. If the guess happens to be right, the whole thing is forgotten. But mistakes are costly. Very few patients fail to recover from diphtheria if anti-toxin is given on the first or second day after

Contributed by the Department of Health

onset. Studies have shown that in two-thirds of the fatal cases of diphtheria the doctor has not been called until the third day or later.

Delays Dangerous

Another disease that goes from bad to worse because of false diagnosis and improper treatment is tuberculosis. Early symptoms of tuberculosis have been well publicised in this country in the last few years, and people who ignore them have only themselves to blame for whatever consequences may develop. Again, syphilis may be cured by prompt diagnosis and adequate treatment, but delay makes complete recovery doubtful and reduces the value of any treatment.

These illustrations could be multiplied, but enough have been quoted to emphasise the importance of skilled medical attention when health problems crop up. Through vaccination, immunisation, proper dietary habits, proper sanitation, and hygiene a whole host of diseases can be prevented.

Call the Doctor

In spite of these things, however, acute illnesses arise from time to time. When they do get a skilled medical man in. If you don't you're taking chances with a very valuable life. The same thing applies whenever a person's health gives any cause for suspicion—call the doctor. Don't try and do his job yourself.

LIGHT

*So many of us fear the dark;
Yet one small candle in a room
Alters things so that it appears
Relieved of gloom.*

*Life's darkness alters when we find
The light of friendship, and for me
All fears were gone when your love lit
My world for me.*

GOOD FORTUNE.

*Diligence is the mother of good
fortune.—Cervantes in "Don Quixote."*

FATE.

Fate is character.

—Winter.

Thoughts for the Quiet Hour

*Is your cruse of comfort waning?
Rise and share it with another. . . .
Seldom need the heart be lonely,
If it seek a lonelier still.
Self forgetting, seeking always
Some more empty cup to fill.*

From "DEB", OXFORD.

*"Do to-day's duty, fight to-day's
temptation; do not weaken and distract
yourself by looking forward to things
which you cannot see and could not
understand if you saw them."—Charles
Kingsley.*

—From "KAHIKATEA," MARTON.

*When you are blue,
Find something to do
For somebody else
Who is bluer than you.*

(Motto on a Wayside Pulpit.)

—From "HOMESPUN," OROUA.

*Sing a little, work a little,
Whistle and be gay,
Read a little, laugh a little,
Busy all the day.
Talk a little, play a little,
Don't forget to pray,
Be a bit of merry sunshine
All the blessed day.*

—From "EFFIE," MURCHISON.

*"Meanwhile if these hours be dark at
least do not let us sit . . . beaten by the
muddle; but rather let us work like good
fellows trying by some dim candlelight
to set our workshops ready against to-
morrow's daylight."—William Morris.*

—From "ROUNABOUT," K.C.

*"When a bit of sunshine hits you,
After passing of a cloud,
And a fit of laughter gets you
And your soul is feeling proud,
Don't forget to up and sling it
At a soul who's feeling blue,
For the minute that you sling it,
It's a boomerang to you."*

—"M", FEILDING.

*Rainbow at night
Is the sailor's delight;
Rainbow in the morning,
Sailors, take warning.*

Rhyme for a Fireplace

*Stranger, now no more unknown,
Let my comfort be your own.
Friend, for whom my dwelling stands,
Take your joy from both my hands.
Love, for whom my hearth logs shine,
Fill your heart with peace from mine.
God, to Whom we make our prayer,
Keep us warm within Thy care.*

—DOROTHY KISSLING.

Notions for Nutcrack Night

NUTS and vegetables play a prominent part in the Welsh celebrations of Nutcrack Night, as Hal-low'e'n is often called. Yorkshire folk give seed cake pride of place on their tea tables, and in other parts of England apples form the main ingredients of so many dishes that the eve of October 31 is referred to as Snap-apple Night. So if you wish to follow the old customs, be sure to feature some of these items on your menu—tarts filled with mincemeat or orange, apple cake, pumpkin pie, nut-sprinkled sponges, and apples and carrots dipped in toffee. Use your ingenuity to conjure up new ways of presenting your favourite biscuit recipes: cheese straws can be cut to resemble broomsticks, for instance; horse-shoe shapes made of chocolate shortbread would bring any one good luck, as would marshmallow squares topped with four-leaf clovers.

Fill a black bowl with fruit and nuts for a centre-piece and dress your small daughter's doll as a witch to preside over it. Set out your gayest china, and mark each guest's place with initials of apple peel and the scene is all set for the jolliest Hal-low'e'n supper ever!

APPLE CAKE.

2 cups flour, 1 cup sugar, 1 teaspoon cinnamon, $\frac{1}{2}$ teaspoon nutmeg, $1\frac{1}{2}$ teaspoons baking soda, $\frac{1}{2}$ cup sultanas, 1oz. chopped lemon peel, $1\frac{1}{2}$ cups stewed apple, 2oz. butter.

Sift the flour and baking soda, and add the sugar, spices, and fruit, except the apples. Heat the apples and melt the butter with them, then mix well with the other ingredients. Pour into a cake tin lined with greased paper. Bake in a moderate oven for $1\frac{1}{2}$ hours. This cake is better kept for a few days before cutting.

MINCE PIES.

8oz. pastry. $\frac{1}{2}$ lb. apples (net weight when peeled and minced), $\frac{1}{2}$ lb. brown sugar, $\frac{1}{2}$ lb. sultanas, $\frac{1}{2}$ lb. currants, $\frac{1}{2}$ lemon (rind and juice), $\frac{1}{2}$ teaspoon cinnamon, $\frac{1}{2}$ teaspoon ground ginger.

Cut the pastry into rounds and line patty tins. Mix the fruit, sugar, and spices well together, and fill each patty tin, then cover with a round of pastry. Bake in a hot oven 10-15 minutes.

ORANGE TART.

6oz. short pastry. 1oz. butter, 2oz. sugar, 1oz. custard powder, 1 egg, 2 teaspoons orange crystals, $\frac{1}{2}$ teaspoon essence of lemon.

Roll out three-quarters of the pastry and line a pie-plate. Melt the butter, add the sugar and custard powder mixed with a little water, and bring to the boil, stirring all the while. Then add the egg lightly beaten and let the mixture cook for one minute without boiling. Finally add the orange crystals and lemon flavouring. Pour this into the tart and decorate with strips of the remaining pastry rolled out thinly and placed lattice-wise over the orange filling. Bake in a moderate oven for 20 minutes.

DOUGHNUTS.

1 egg, 3 tablespoons sugar, 3 tablespoons milk, 1 tablespoon butter, 1 cup

flour, $1\frac{1}{2}$ teaspoons baking powder, $\frac{1}{2}$ teaspoon salt, fat for frying, a little grated lemon or orange rind.

Beat the egg well, then add the sugar and grated lemon or orange rind and continue beating till thick and spongy. Stir in the butter (melted) and the milk, then sift the flour, baking powder, and salt into the mixture and beat lightly. Drop teaspoonfuls into hot, deep fat and cook till nicely brown. Drain well and dip in icing sugar. (This recipe makes a dozen doughnuts).

ARROWROOT SPONGE.

3 eggs, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup arrowroot, $\frac{1}{2}$ teaspoon baking powder, pinch salt.

Sift the arrowroot, baking powder, and salt three times. Beat the eggs and sugar till stiff, then add the arrow-



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root, etc., and beat for 10 minutes. Pour into two 8in. sandwich tins (un-greased). Bake in a moderate oven for 20 minutes. When cool ice and fill as desired. To convert this recipe into a coffee sponge add 1 dessert-spoon of coffee essence to the mixture before baking, and use a butter icing flavoured with vanilla for a filling, and coffee icing and walnuts on top. To make a jam roll cook the sponge in a shallow, oblong-shaped tin or a meat-dish. A cinnamon sponge requires these additional ingredients: 2 tablespoons flour, 1 teaspoon ground ginger, 1 teaspoon cinnamon, and 1 teaspoon cocoa. Lastly, fold in 1 tablespoon golden syrup. Grease the sandwich tins before pouring in the mixture. When cooked decorate with chocolate icing and raisins. (Sent in by "Biddi-Jan.")

SEED CAKE.

9oz. flour, 7oz. sugar, 1½ teaspoons baking powder, 3oz. butter, 3oz. beef dripping, 4 eggs (or 3 eggs and 1 tablespoon milk), 1 tablespoon caraway seeds (or caraway essence if preferred).

Cream the butter, dripping, and sugar together, then add the eggs, beating in one by one. Lastly add the flour and baking powder sifted together, then the caraway seeds or essence. Bake in a moderate oven for an hour.

BROOMSTICKS.

2 cups flour, ½ teaspoon baking powder, ½ teaspoon salt (use ¼ teaspoon salt and ¼ teaspoon celery salt if you have it), 2oz. butter, 1oz. lard, 3oz. grated cheese, cayenne pepper sufficient to cover 3d.

Sift the flour, baking powder, and salt. Rub in the lard and butter, then add the cheese and cayenne. Mix to a stiff dough with water and roll out on a floured board. Cut into broom-stick shapes and bake in a moderate oven for 15 minutes.

FOUR-LEAF CLOVERS.

3oz. butter, 4oz. sugar, 1 egg, 1½ cups flour, 1 teaspoon baking powder. **Marshmallow:** 2 dessertspoons gelatine, 1 cup water, 1 cup sugar. Green jubes.

Cream the butter and sugar, add the egg and the dry ingredients sifted. Roll out to a ¼in. in thickness, cut into several sections, and bake 15-20 minutes.

To make the marshmallow boil the gelatine, sugar, and water together for 8 minutes. Allow to cool and then beat with a rotary beater till white and thick. Spread over the shortbread. Then cut the shortbread into squares and on each one make a pattern of four-leaf clovers with thin slices of green jubes.

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PUMPKIN PIE.

1½ cups cooked mashed pumpkin, ½ cup sugar, 1 teaspoon cinnamon, ½ teaspoon ground ginger, 2 eggs, 2 cups milk, pie shell (short pastry).

Line a pie plate with short pastry and crinkle the edges. Now mix the sugar, cinnamon, ginger, and pumpkin together, and stir in the eggs lightly beaten and the milk. Pour into the pie shell and bake in a hot oven for a quarter of an hour till the crust edges brown and then reduce the heat to a moderate temperature and continue baking for ½ hour.

TOFFEE APPLES.

2 cups sugar, 2 tablespoons vinegar, 2 tablespoons water, apples.

Bring sugar, vinegar and water to the boil and boil fast for ¼ hour. Do not stir while boiling. A little dropped in cold water should set hard. Dip the apples (which have previously been mounted on sticks) into the toffee and place on a buttered plate to set. Do not let the apples touch each other, as the toffee will crack when you separate them. This recipe is sufficient to cover 6 medium-sized apples.

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